

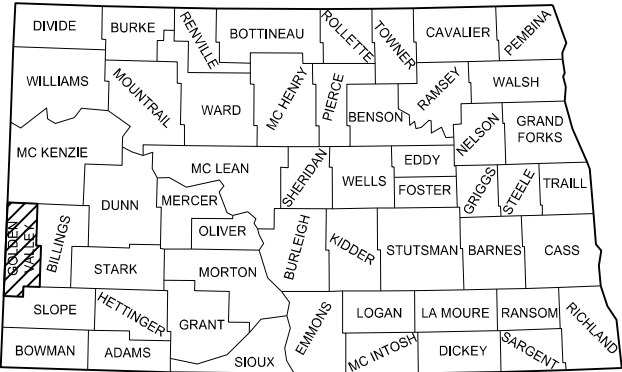
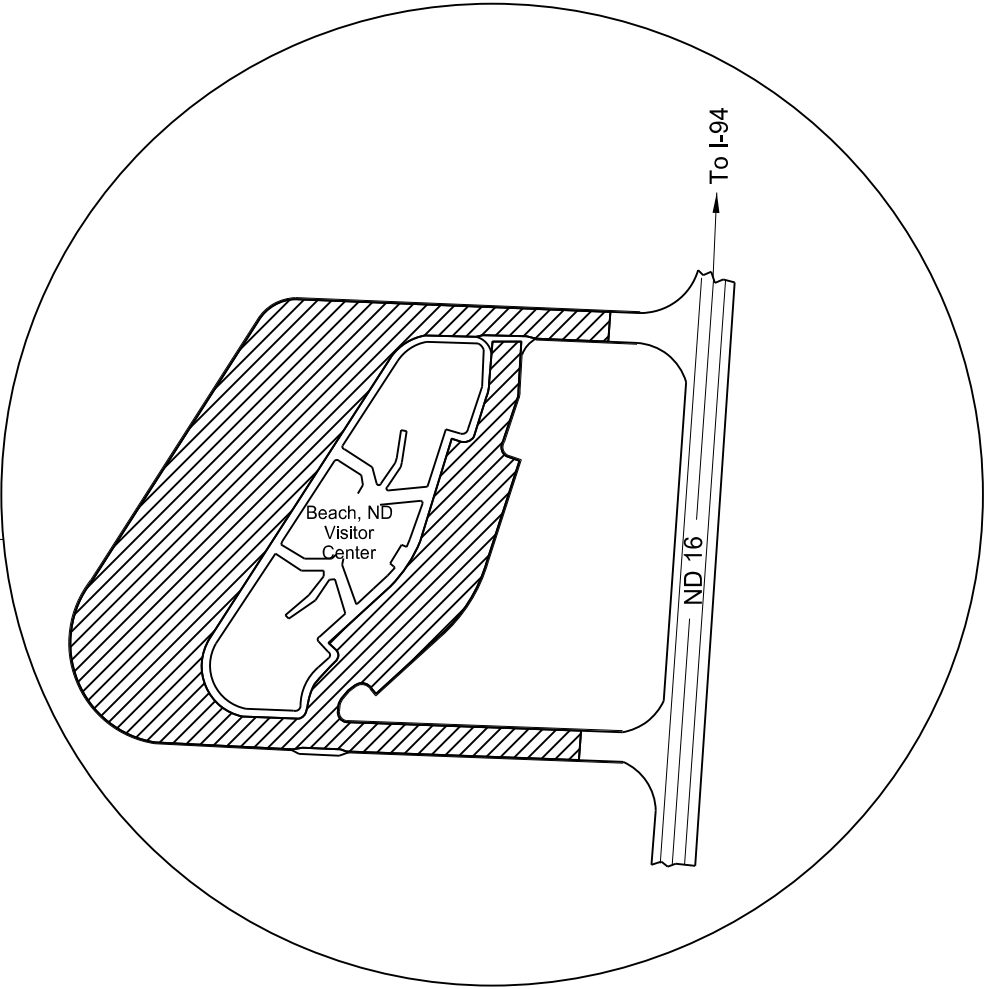
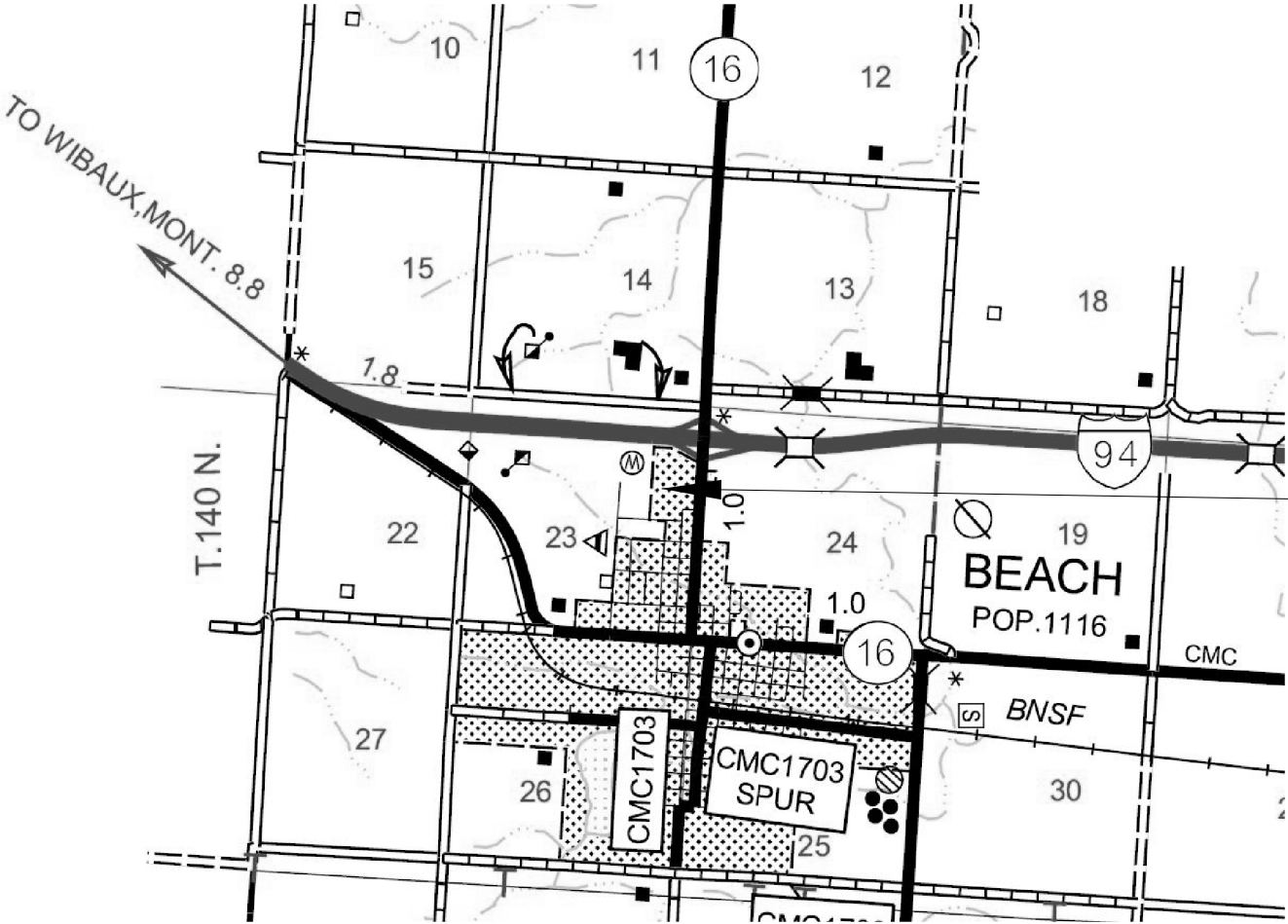
JOB # 25  
NORTH DAKOTA  
DEPARTMENT OF TRANSPORTATION

|  |       |                 |       |             |           |
|--|-------|-----------------|-------|-------------|-----------|
|  | STATE | PROJECT NO.     | PCN   | SECTION NO. | SHEET NO. |
|  | ND    | H-5-094(118)001 | 21493 | 1           | 1         |

GOVERNING SPECIFICATIONS:  
2014 Standard Specifications adopted by the North Dakota  
Department of Transportation and the Supplemental Specifications  
effective on the date the project is advertised.

| PROJECT NUMBER \ DESCRIPTION | NET MILES | GROSS MILES |
|------------------------------|-----------|-------------|
| H-5-094(118)001 \ Chip Seal  | N/A       | N/A         |

H-5-094(118)001  
Golden Valley  
Beach Visitor Center  
Chip Seal



STATE COUNTY MAP

DESIGNERS

Jason Fischer /s/

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 01/29/16

Rob Rayhorn /s/  
Assistant District Engineer

APPROVED DATE 01/29/16

Lawrence Gangl /s/  
Dickinson District Engineer  
ND DEPARTMENT OF TRANSPORTATION

This document was originally issued and sealed by  
Rob Rayhorn  
Registration Number  
PE- 4289,  
on 01/29/16 and the original document is stored at the  
North Dakota Department  
of Transportation

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|                   |         |                           |                           |   |  | ND    | H-5-094(118)001 | 2           | 1         |
| PLAN SECTIONS     |         |                           | LIST OF STANDARD DRAWINGS |   |  |       |                 |             |           |
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| 10                | 1       | Basis of Estimate         | D-704-7                   | Breakaway Systems for Construction Zone Signs - Perforated Tube |  |       |                 |             |           |
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| STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
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**NOTES**

- 100-P01

TIED PROJECT: This project is tied to projects SOIB-5-016(024)060, SOIB-5-021(024)052 and SOIB-5-008(047)012. Flagging signs shown in detail 704-15 (Type A) and stop sign and truck entering signs shown in detail 704-22 (Type K) will be used on all projects, but paid for once on project SOIB-5-008(047)012
- 100-P02

TIED PROJECT: Include Contract Bond and Mobilization costs in tied project SOIB-5-008(047)012
- 107-710

HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".
- 704-P01

TRAFFIC CONTROL FOR SEALCOAT: Traffic control for the chip seal consists of closing the visitor center while work is taking place. The visitor center can be closed for two days for the seal coat operation and another two days after the maintenance period for the final sweeping and permanent striping operation.

Maintain traffic during the maintenance period. During this time, install and maintain Fresh Oil Loose Rock W20-52-54 signs at both entrances to the visitor center parking lot.

The required traffic control signs and devices are included in the “Traffic Control Devices” List.

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ESTIMATE OF QUANTITIES

|       |                 |             |           |
|-------|-----------------|-------------|-----------|
| STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
| ND    | H-5-094(118)001 | 8           | 1         |

| SPEC CODE | ITEM DESCRIPTION               | UNIT | MAINLINE | TOTAL |
|-----------|--------------------------------|------|----------|-------|
| 420       | 0111 CRS2P EMULSIFIED ASPHALT  | GAL  | 4,391    | 4,391 |
| 420       | 0125 COVER COAT MATERIAL CL 41 | TON  | 145      | 145   |
| 704       | 1000 TRAFFIC CONTROL SIGNS     | UNIT | 196      | 196   |
| 704       | 1052 TYPE III BARRICADE        | EA   | 8        | 8     |
| 762       | 1104 PVMT MK PAINTED 4IN LINE  | LF   | 4,403    | 4,403 |

|       |                 |             |           |
|-------|-----------------|-------------|-----------|
| STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
| ND    | H-5-094(118)001 | 10          | 1         |

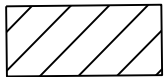
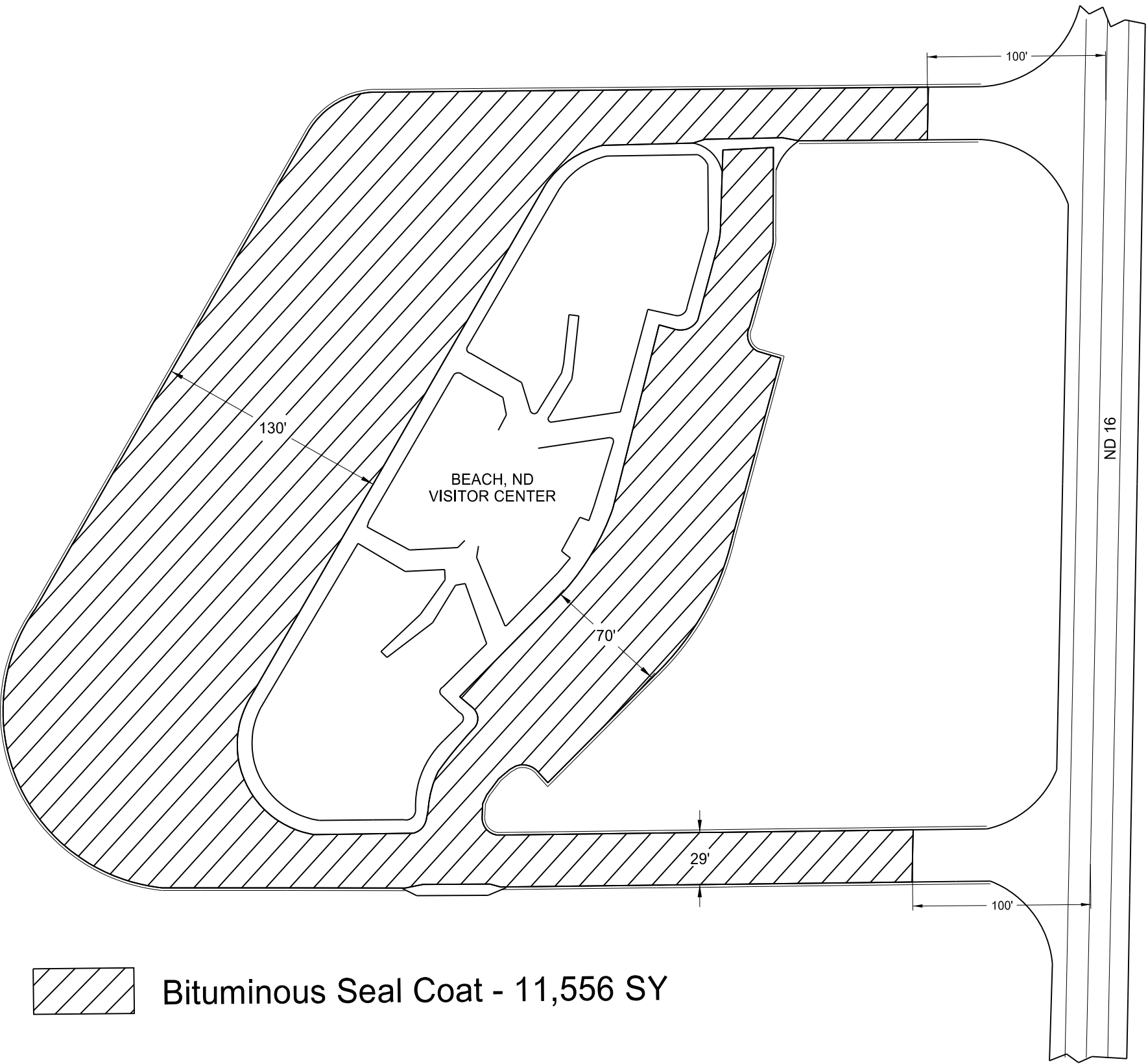
|                              |      | Beach Visitor Center |          |
|------------------------------|------|----------------------|----------|
| Material                     | Unit | Area (SY)            | Quantity |
| CRS2P @ 0.38 Gal/SY          | Gal  | 11,556               | 4391     |
| Cover Coat CL 41 @ 25 lbs/SY | Ton  | 11,556               | 145      |

| Location - Type                            | Quantity |
|--|----------|
| White – Pavement Marking Painted 4 IN Line | 4192 LF  |
| Blue – Pavement Marking Painted 4 IN Line  | 211 LF   |

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Basis of Estimate  
Beach Visitor Center

| STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
|-------|-----------------|-------------|-----------|
| ND    | H-5-094(118)001 | 20          | 1         |



Bituminous Seal Coat - 11,556 SY

Estimate of Quantities

420-125 COVERCOAT MATERIAL CL 41 - 145 TON  
420-111 CRS2P EMULSIFIED ASPHALT - 4391 GAL

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Bituminous Seal Coat Details  
Beach Visitor Center

|       |                 |             |           |
|-------|-----------------|-------------|-----------|
| STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
| ND    | H-5-094(118)001 | 100         | 1         |

| SIGN<br>NUMBER | SIGN<br>SIZE | DESCRIPTION  | AMOUNT<br>REQUIRED | UNITS<br>PER<br>AMOUNT | UNITS<br>SUB<br>TOTAL |
|----------------|--------------|--|--------------------|------------------------|-----------------------|
| D3-36          | 36"x6"       | STREET NAME SIGN (Sign and installation only)                      |                    | 6                      |                       |
| G20-1-60       | 60"x24"      | ROAD WORK NEXT ____ MILES  |                    | 34                     |                       |
| G20-1b-60      | 60"x24"      | WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only) |                    | 26                     |                       |
| G20-2-48       | 48"x24"      | END ROAD WORK  |                    | 19                     |                       |
| G20-4-36       | 36"x18"      | PILOT CAR FOLLOW ME (Mounted to back of pilot car)                 |                    | 18                     |                       |
| G20-10-108     | 108"x48"     | CONTRACTOR SIGN  |                    | 64                     |                       |
| G20-50a-72     | 72"x36"      | ROAD WORK NEXT ____ MILES RT & LT ARROWS                           |                    | 37                     |                       |
| G20-52a-72     | 72"x24"      | ROAD WORK NEXT ____ MILES RT or LT ARROW                           |                    | 30                     |                       |
| G20-55-96      | 96"x48"      | SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT       |                    | 59                     |                       |
| M1-1-36        | 36"x36"      | INTERSTATE ROUTE MARKER (Post and installation only)               |                    | 10                     |                       |
| M1-4-24        | 24"x24"      | U.S. ROUTE MARKER (Post and installation only)                     |                    | 10                     |                       |
| M1-5-24        | 24"x24"      | STATE ROUTE MARKER (Post and installation only)                    |                    | 10                     |                       |
| M3-1-24        | 24"x12"      | NORTH (Mounted on route marker post)                               |                    | 7                      |                       |
| M3-2-24        | 24"x12"      | EAST (Mounted on route marker post)                                |                    | 7                      |                       |
| M3-3-24        | 24"x12"      | SOUTH (Mounted on route marker post)                               |                    | 7                      |                       |
| M3-4-24        | 24"x12"      | WEST (Mounted on route marker post)                                |                    | 7                      |                       |
| M4-8-24        | 24"x12"      | DETOUR (Mounted on route marker post)                              |                    | 7                      |                       |
| M4-9-30        | 30"x24"      | DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT                        |                    | 15                     |                       |
| M4-10-48       | 48"x18"      | DETOUR ARROW RIGHT or LEFT   |                    | 23                     |                       |
| M5-1-21        | 21"x15"      | ARROW AHD AND RT or LT (Mounted on route marker post)              |                    | 7                      |                       |
| M5-2-21        | 21"x15"      | ARROW AHD UP & RT or LT (Mounted on route marker post)             |                    | 7                      |                       |
| M6-1-21        | 21"x15"      | ARROW RT or LT (Mounted on route marker post)                      |                    | 7                      |                       |
| M6-2-21        | 21"x15"      | ARROW UP & RT or LT (Mounted on route marker post)                 |                    | 7                      |                       |
| M6-3-21        | 21"x15"      | ARROW AHD (Mounted on route marker post)                           |                    | 7                      |                       |
| R1-1-48        | 48"x48"      | STOP   |                    | 32                     |                       |
| R1-1a-18       | 18"x18"      | STOP and SLOW PADDLE Back to Back                                  |                    | 5                      |                       |
| R1-2-60        | 60"x60"      | YIELD  |                    | 29                     |                       |
| R2-1-48        | 48"x60"      | SPEED LIMIT ____   |                    | 39                     |                       |
| R2-1a-24       | 24"x18"      | MINIMUM FEE \$80 (Mounted on Speed Limit post)                     |                    | 10                     |                       |
| R3-7-48        | 48"x48"      | LEFT or RIGHT LANE MUST TURN LEFT or RIGHT                         |                    | 35                     |                       |
| R4-1-48        | 48"x60"      | DO NOT PASS  |                    | 39                     |                       |
| R4-7-48        | 48"x60"      | KEEP RIGHT SYMBOL  |                    | 39                     |                       |
| R5-1-48        | 48"x48"      | DO NOT ENTER   |                    | 35                     |                       |
| R6-1-36        | 36"x12"      | ONE WAY RIGHT or LEFT  |                    | 13                     |                       |
| R7-1-12        | 12"x18"      | NO PARKING   |                    | 11                     |                       |
| R10-6-24       | 24"x36"      | STOP HERE ON RED   |                    | 16                     |                       |
| R11-2-48       | 48"x30"      | ROAD CLOSED  | 2                  | 28                     | 56                    |
| R11-2a-48      | 48"x30"      | STREET CLOSED  |                    | 28                     |                       |
| R11-3a-60      | 60"x30"      | ROAD CLOSED ____ MILES AHEAD LOCAL TRAFFIC ONLY                    |                    | 31                     |                       |
| R11-3c-60      | 60"x30"      | STREET CLOSED ____ MILES AHEAD LOCAL TRAFFIC ONLY                  |                    | 31                     |                       |
| R11-4a-60      | 60"x30"      | STREET CLOSED TO THRU TRAFFIC                                      |                    | 31                     |                       |
| W1-3-48        | 48"x48"      | RIGHT or LEFT SHARP REVERSE CURVE ARROW                            |                    | 35                     |                       |
| W1-4-48        | 48"x48"      | RIGHT or LEFT REVERSE CURVE ARROW                                  |                    | 35                     |                       |
| W1-4b-48       | 48"x48"      | DOUBLE RIGHT or LEFT REVERSE CURVE ARROW                           |                    | 35                     |                       |
| W1-6-48        | 48"x24"      | LARGE ARROW  |                    | 26                     |                       |
| W3-1-48        | 48"x48"      | STOP AHEAD SYMBOL  |                    | 35                     |                       |
| W3-3-48        | 48"x48"      | SIGNAL AHEAD SYMBOL  |                    | 35                     |                       |
| W3-4-48        | 48"x48"      | BE PREPARED TO STOP  |                    | 35                     |                       |
| W3-5-48        | 48"x48"      | SPEED REDUCTION AHEAD  |                    | 35                     |                       |
| W4-2-48        | 48"x48"      | RIGHT or LEFT LANE TRANSITION SYMBOL                               |                    | 35                     |                       |
| W5-1-48        | 48"x48"      | ROAD NARROWS   |                    | 35                     |                       |
| W5-8-48        | 48"x48"      | THRU TRAFFIC RIGHT LANE  |                    | 35                     |                       |
| W5-9-48        | 48"x48"      | ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW                       |                    | 35                     |                       |
| W6-3-48        | 48"x48"      | TWO WAY TRAFFIC SYMBOL   |                    | 35                     |                       |
| W8-1-48        | 48"x48"      | BUMP   |                    | 35                     |                       |
| W8-3-48        | 48"x48"      | PAVEMENT ENDS  |                    | 35                     |                       |
| W8-7-48        | 48"x48"      | LOOSE GRAVEL   |                    | 35                     |                       |
| W8-9a-48       | 48"x48"      | SHOULDER DROP-OFF  |                    | 35                     |                       |
| W8-11-48       | 48"x48"      | UNEVEN LANES   |                    | 35                     |                       |
| W8-12-48       | 48"x48"      | NO CENTER STRIPE   |                    | 35                     |                       |
| W8-53-48       | 48"x48"      | TRUCKS ENTERING HIGHWAY  |                    | 35                     |                       |
| W8-54-48       | 48"x48"      | TRUCKS ENTERING AHEAD or ____ FT.                                  | 2                  | 35                     | 70                    |
| W8-55-48       | 48"x48"      | TRUCKS CROSSING AHEAD or ____ FT.                                  |                    | 35                     |                       |
| W8-56-48       | 48"x48"      | TRUCKS EXITING HIGHWAY   |                    | 35                     |                       |
| W9-3a-48       | 48"x48"      | CENTER LANE CLOSED SYMBOL  |                    | 35                     |                       |
| W12-2-48       | 48"x48"      | LOW CLEARANCE SYMBOL   |                    | 35                     |                       |
| W13-1-24       | 24"x24"      | ____ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)       |                    | 11                     |                       |
| W13-4-48       | 48"x60"      | RAMP ARROW   |                    | 39                     |                       |
| W14-3-48       | 48"x36"      | NO PASSING ZONE  |                    | 23                     |                       |
| W20-1-48       | 48"x48"      | ROAD WORK AHEAD or ____ FT or ____ MILE                            |                    | 35                     |                       |
| W20-2-48       | 48"x48"      | DETOUR AHEAD or ____ FT  |                    | 35                     |                       |
| W20-3-48       | 48"x48"      | ROAD or STREET CLOSED AHEAD or ____ FT.                            |                    | 35                     |                       |
| W20-4-48       | 48"x48"      | ONE LANE ROAD AHEAD or ____ FT.                                    |                    | 35                     |                       |
| W20-5-48       | 48"x48"      | RIGHT or LEFT LANE CLOSED AHEAD or ____ FT.                        |                    | 35                     |                       |
| W20-7a-48      | 48"x48"      | FLAGGING SYMBOL  |                    | 35                     |                       |
| W20-7k-24      | 24"x18"      | ____ FEET (Mounted on warning sign post)                           |                    | 10                     |                       |
| W20-8-48       | 48"x48"      | STREET CLOSED  |                    | 35                     |                       |
| W20-51-48      | 48"x48"      | EQUIPMENT WORKING  |                    | 35                     |                       |
| W20-52-54      | 54"x12"      | NEXT ____ MILES (Mounted on warning sign post)                     |                    | 12                     |                       |
| W21-1a-48      | 48"x48"      | WORKERS SYMBOL   |                    | 35                     |                       |
| W21-2-48       | 48"x48"      | FRESH OIL  |                    | 35                     |                       |
| W21-3-48       | 48"x48"      | ROAD MACHINERY AHEAD or ____ FT                                    |                    | 35                     |                       |

[illegible][illegible]

| SPEC & CODE |                       |             |     |
|-------------|-----------------------|-------------|-----|
| 704-1000    | TRAFFIC CONTROL SIGNS | TOTAL UNITS | 196 |

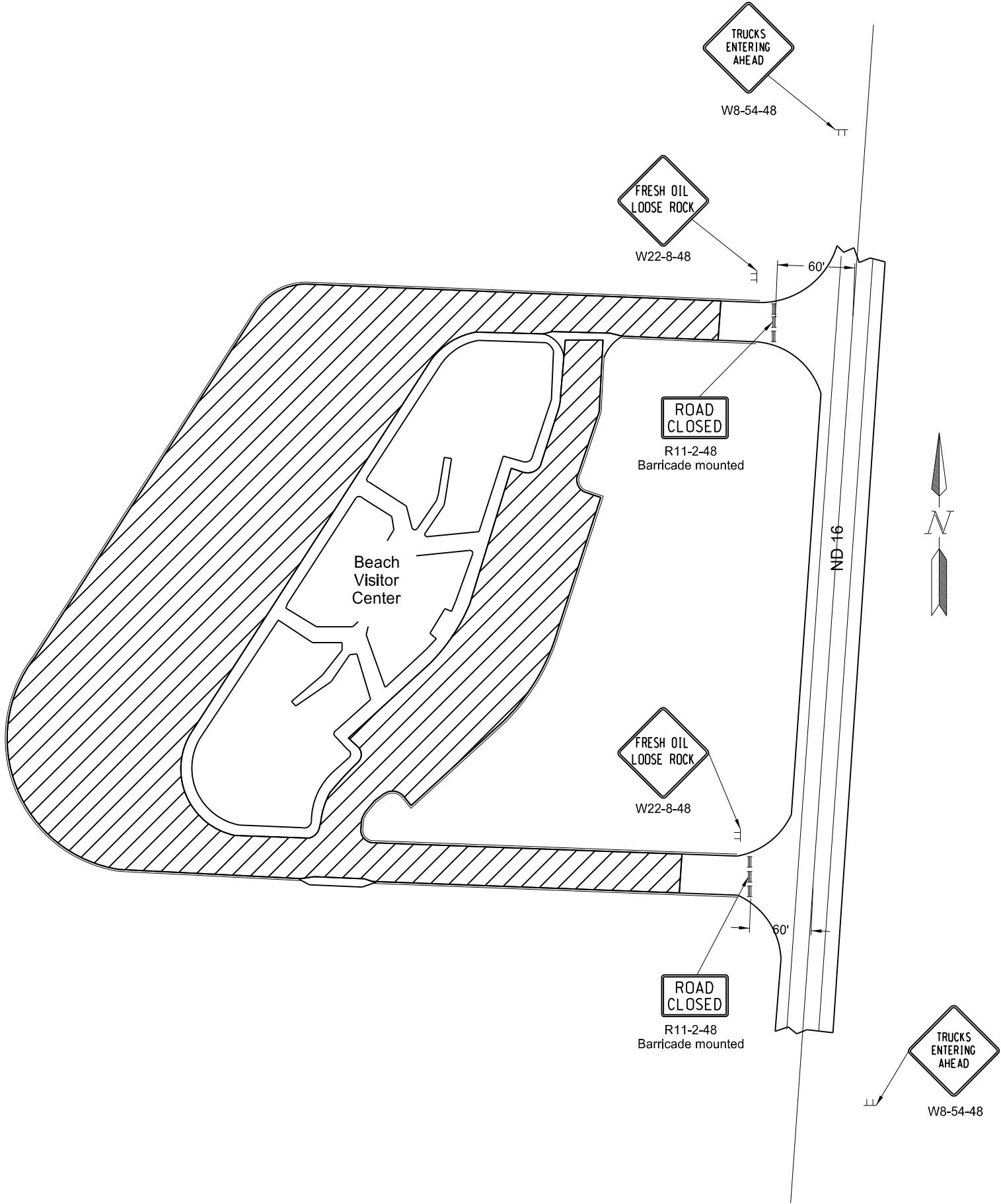
| SPEC &<br>CODE | DESCRIPTION                                    | UNIT | QUANTITY |
|----------------|--|------|----------|
| 704-0100       | FLAGGING                                       | MHR  |          |
| 704-1041       | ATTENUATION DEVICE-TYPE B-55                   | EACH |          |
| 704-1043       | ATTENUATION DEVICE-TYPE B-65                   | EACH |          |
| 704-1044       | ATTENUATION DEVICE-TYPE B-70                   | EACH |          |
| 704-1050       | TYPE I BARRICADES                              | EACH |          |
| 704-1051       | TYPE II BARRICADES                             | EACH |          |
| 704-1052       | TYPE III BARRICADES                            | EACH | 8        |
| 704-1060       | DELINEATOR DRUMS                               | EACH |          |
| 704-1065       | TRAFFIC CONES                                  | EACH |          |
| 704-1067       | TUBULAR MARKERS                                | EACH |          |
| 704-1070       | DELINEATOR                                     | EACH |          |
| 704-1072       | FLEXIBLE DELINEATORS                           | EACH |          |
| 704-1081       | VERTICAL PANELS - BACK TO BACK                 | EACH |          |
| 704-1085       | SEQUENCING ARROW PANEL - TYPE A                | EACH |          |
| 704-1086       | SEQUENCING ARROW PANEL - TYPE B                | EACH |          |
| 704-1087       | SEQUENCING ARROW PANEL - TYPE C                | EACH |          |
| 704-1088       | SEQUENCING ARROW PANEL - TYPE C - CROSSOVER    | EACH |          |
| 704-1095       | TYPE B FLASHERS                                | EACH |          |
| 704-1500       | OBLITERATION OF PVMT MK                        | SF   |          |
| 704-3501       | PORTABLE PRECAST CONCRETE MED BARRIER          | LF   |          |
| 704-3510       | PRECAST CONCRETE MED BARRIER - STATE FURNISHED | EACH |          |
| 762-0200       | RAISED PAVEMENT MARKERS                        | EACH |          |
| 762-0420       | SHORT TERM 4IN LINE - TYPE R                   | LF   |          |
| 762-0430       | SHORT TERM 4IN LINE - TYPE NR                  | LF   |          |
| 772-2110       | FLASHING BEACON - POST MOUNTED                 | EACH |          |
|                |  |      |          |
|                |  |      |          |
|                |  |      |          |
|                |  |      |          |
|                |  |      |          |

**NOTE:**  
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.  
<http://www.dot.nd.gov/>

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## Traffic Control Devices List

|  |       |                 |             |           |
|--|-------|-----------------|-------------|-----------|
|  | STATE | PROJECT NO.     | SECTION NO. | SHEET NO. |
|  | ND    | H-5-094(118)001 | 100         | 2         |



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Traffic Control  
Beach Visitor Center



|        |   |                    |                                     |
|--------|---|--------------------|-------------------------------------|
| ?      | This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose. |                    |                                     |
| Abn    | abandoned   | BV                 | butterfly valve                     |
| Abut   | abutment  | Byp                | bypass                              |
| Ac     | acres   | C Gdrl             | cable guardrail                     |
| Adj    | adjusted  | Calc               | calculate                           |
| Aggr   | aggregate   | Cd                 | candela                             |
| Ahd    | ahead   | CIP                | cast iron pipe                      |
| ARV    | air release valve   | CB                 | catch basin                         |
| Align  | alignment   | CRS                | cationic rapid setting              |
| Al     | alley   | C Gd               | cattle guard                        |
| Alt    | alternate   | C To C             | center to center                    |
| Alum   | aluminum  | Cl or $\text{C}_L$ | centerline                          |
| ADA    | Americans with Disabilities Act   | Cm                 | centimeter                          |
| A      | ampere  | Ch                 | chain                               |
| &      | and   | Chnlk              | chain-link                          |
| Appr   | approach  | Ch Blk             | channel block                       |
| Approx | approximate   | Ch Ch              | channel change                      |
| ACP    | asbestos cement pipe  | Chk                | check                               |
| Asph   | asphalt   | Chsld              | chiseled                            |
| AC     | asphalt cement  | Cir                | circle                              |
| Assmd  | assumed   | Cl                 | class                               |
| @      | at  | Cl                 | clay                                |
| Atten  | attenuation   | Cl F               | clay fill                           |
| ATR    | automatic traffic recorder  | Cl Hvy             | clay heavy                          |
| Ave    | Avenue  | Cl Lm              | clay loam                           |
| Avg    | average   | Clnt               | clean-out                           |
| ADT    | average daily traffic   | Clr                | clear                               |
| Az     | azimuth   | Cl&gr              | clearing & grubbing                 |
| Bk     | back  | Co S               | coal slack                          |
| BF     | back face   | Comb.              | combination                         |
| Bs     | backsight   | Coml               | commercial                          |
| Balc   | balcony   | Compr              | compression                         |
| B Wire | barbed wire   | CADD               | computer aided drafting & design    |
| Barr   | barricade   | Conc               | concrete                            |
| Btry   | battery   | Cond               | conductor                           |
| Brg    | bearing   | Const              | construction                        |
| BI     | beehive inlet   | Cont               | continuous                          |
| Beg    | begin   | CSB                | continuous split barrel sample      |
| BM     | bench mark  | Contr              | contraction                         |
| Bkwy   | bikeway   | Contr              | contractor                          |
| Bit    | bituminous  | CP                 | control point                       |
| Blk    | block   | Coord              | coordinate                          |
| Bd Ft  | board feet  | Cor                | corner                              |
| BH     | bore hole   | Corr               | corrected                           |
| BS     | both sides  | CAES               | corrugated aluminum end section     |
| Bot    | bottom  | CAP                | corrugated aluminum pipe            |
| Blvd   | Boulevard   | CMES               | corrugated metal end section        |
| Bndry  | boundary  | CMP                | corrugated metal pipe               |
| BC     | brass cap   | CPVCP              | corrugated poly-vinyl chloride pipe |
| Brkwy  | breakaway   | CSES               | corrugated steel end section        |
| Br     | bridge  | CSP                | corrugated steel pipe               |
| Bldg   | building  | CSP                | corrugated steel pipe               |
|        |   | C                  | coulomb                             |
|        |   | Co                 | County                              |
|        |   | Crse               | course                              |
|        |   | C Gr               | course gravel                       |
|        |   | CS                 | course sand                         |
|        |   | Ct                 | Court                               |
|        |   | Xarm               | cross arm                           |
|        |   | Xbuck              | cross buck                          |
|        |   | Xsec               | cross sections                      |
|        |   | Xing               | crossing                            |
|        |   | Xrd                | Crossroad                           |
|        |   | Crn                | crown                               |
|        |   | CF                 | cubic feet                          |
|        |   | M3                 | cubic meter                         |
|        |   | M3/s               | cubic meters per second             |
|        |   | CY                 | cubic yard                          |
|        |   | Cy/mi              | cubic yards per mile                |
|        |   | Culv               | culvert                             |
|        |   | C&G                | curb & gutter                       |
|        |   | CI                 | curb inlet                          |
|        |   | CR                 | curb ramp                           |
|        |   | CS                 | curve to spiral                     |
|        |   | C                  | cut                                 |
|        |   | Dd Ld              | dead load                           |
|        |   | Defl               | deflection                          |
|        |   | Defm               | deformed                            |
|        |   | Deg or D           | degree                              |
|        |   | DInt               | delineate                           |
|        |   | DIntr              | delineator                          |
|        |   | Depr               | depression                          |
|        |   | Desc               | description                         |
|        |   | Det                | detail                              |
|        |   | DWP                | detectable warning panel            |
|        |   | Dtr                | detour                              |
|        |   | Dia                | diameter                            |
|        |   | Dir                | direction                           |
|        |   | Dist               | distance                            |
|        |   | DM                 | disturbed material                  |
|        |   | DB                 | ditch block                         |
|        |   | DG                 | ditch grade                         |
|        |   | Dbl                | double                              |
|        |   | Dn                 | down                                |
|        |   | Dwg                | drawing                             |
|        |   | Dr                 | drive                               |
|        |   | Drwy               | driveway                            |
|        |   | DI                 | drop inlet                          |
|        |   | D                  | dry density                         |
|        |   | Ea                 | each                                |
|        |   | Esmt               | easement                            |
|        |   | E                  | East                                |
|        |   | EB                 | Eastbound                           |
|        |   | Elast              | elastomeric                         |
|        |   | EL                 | electric locker                     |
|        |   | E Mtr              | electric meter                      |
|        |   | Elec               | electric/al                         |
|        |   | EDM                | electronic distance meter           |
|        |   | Elev or El         | elevation                           |
|        |   | Ellipt             | elliptical                          |
|        |   | Emb                | embankment                          |
|        |   | Emuls              | emulsion/emulsified                 |
|        |   | ES                 | end section                         |
|        |   | Engr               | engineer                            |
|        |   | ESS                | environmental sensor station        |
|        |   | Eq                 | equal                               |
|        |   | Eq                 | equation                            |
|        |   | Evgr               | evergreen                           |
|        |   | Exc                | excavation                          |
|        |   | Exst               | existing                            |
|        |   | Exp                | expansion                           |
|        |   | Expy               | Expressway                          |
|        |   | E                  | external of curve                   |
|        |   | Extru              | extruded                            |
|        |   | FOS                | factor of safety                    |
|        |   | F                  | Fahrenheit                          |
|        |   | FS                 | far side                            |
|        |   | F                  | farad                               |
|        |   | Fed                | Federal                             |
|        |   | FP                 | feed point                          |
|        |   | Ft                 | feet/foot                           |
|        |   | Fn                 | fence                               |
|        |   | Fn P               | fence post                          |
|        |   | FO                 | fiber optic                         |
|        |   | FB                 | field book                          |
|        |   | FD                 | field drive                         |
|        |   | F                  | fill                                |
|        |   | FAA                | fine aggregate angularity           |
|        |   | FS                 | fine sand                           |
|        |   | FH                 | fire hydrant                        |
|        |   | FI                 | flange                              |
|        |   | Flrd               | flared                              |
|        |   | FES                | flared end section                  |
|        |   | F Bcn              | flashing beacon                     |
|        |   | FA                 | flight auger sample                 |
|        |   | FL                 | flow line                           |
|        |   | Ftg                | footing                             |
|        |   | FM                 | force main                          |
|        |   | Fs                 | foresight                           |
|        |   | Fnd                | found                               |
|        |   | Fdn                | foundation                          |
|        |   | Frac               | fractional                          |
|        |   | Frwy               | freeway                             |
|        |   | Fr                 | front                               |
|        |   | FF                 | front face                          |
|        |   | F Disp             | fuel dispenser                      |

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|         |                                 |        |                           |          |                               |         |                            |
|---------|---------------------------------|--------|---------------------------|----------|-------------------------------|---------|----------------------------|
| FFP     | fuel filler pipes               | IPn    | Iron Pin                  | MC       | medium curing                 | Ped     | pedestal                   |
| FLS     | fuel leak sensor                | IP     | Iron Pipe                 | M        | mega                          | Ped     | pedestrian                 |
| Furn    | furnish/ed                      | Jt     | joint                     | Mer      | meridian                      | PPP     | pedestrian pushbutton post |
| Gal     | gallon                          | J      | joule                     | M        | meter                         | Pen.    | penetration                |
| Galv    | galvanized                      | Jct    | junction                  | M/s      | meters per second             | Perf    | perforated                 |
| Gar     | garage                          | K      | kelvin                    | M        | mid ordinate of curve         | Per.    | perimeter                  |
| Gs L    | gas line                        | Kn     | kilo newton               | Mi       | mile                          | PL      | pipeline                   |
| G Reg   | gas line regulator              | Kpa    | kilo pascal               | MM       | mile marker                   | PI      | place                      |
| GMV     | gas main valve                  | Kg     | kilogram                  | MP       | mile post                     | P&P     | plan & profile             |
| G Mtr   | gas meter                       | Kg/m3  | kilogram per cubic meter  | MI       | milliliter                    | PL      | plastic limit              |
| GSV     | gas service valve               | Km     | kilometer                 | Mm       | millimeter                    | PI      | plate                      |
| GVP     | gas vent pipe                   | K      | Kip(s)                    | Mm/hr    | millimeters per hour          | Pt      | point                      |
| GV      | gate valve                      | LS     | Land Surveyor (licensed)  | Min      | minimum                       | PCC     | point of compound curve    |
| Ga      | gauge                           | LSIT   | Land Surveyor In Training | Misc     | miscellaneous                 | PC      | point of curve             |
| Geod    | geodetic                        | Ln     | lane                      | Mon      | monument                      | PI      | point of intersection      |
| GIS     | Geographical Information System | Lg     | large                     | Mnd      | mound                         | PRC     | point of reverse curvature |
| G       | giga                            | Lat    | latitude                  | Mtbl     | mountable                     | PT      | point of tangent           |
| GPS     | Global Positioning System       | Lt     | left                      | Mtd      | mounted                       | POC     | point on curve             |
| Gov     | government                      | L      | length of curve           | Mtg      | mounting                      | POT     | point on tangent           |
| Grd     | graded/grade                    | Lens   | lenses                    | Mk       | muck                          | PE      | polyethylene               |
| Gr      | gravel                          | Lvl    | level                     | Mun      | municipal                     | PVC     | polyvinyl chloride         |
| Grnd    | ground                          | LB     | level book                | N        | nano                          | PCC     | Portland Cement concrete   |
| GWM     | ground water monitor            | Lvlng  | leveling                  | NGS      | National Geodetic Survey      | Lb or # | pounds                     |
| Gdrl    | guardrail                       | Lht    | light                     | NS       | near side                     | PP      | power pole                 |
| Gtr     | gutter                          | LP     | light pole                | Neop     | neoprene                      | Preempt | preemption                 |
| H Plg   | H piling                        | Ltg    | lighting                  | Ntwk     | network                       | Prefab  | prefabricated              |
| Hdwl    | headwall                        | Lig Co | lignite coal              | N        | newton                        | Prfmd   | preformed                  |
| Ha      | hectare                         | Lig Sl | lignite slack             | N        | North                         | Prep    | preperation                |
| Ht      | height                          | LF     | linear foot               | NE       | North East                    | Press.  | pressure                   |
| HI      | height of instrument            | Liq    | liquid                    | NW       | North West                    | PRV     | pressure relief valve      |
| Hel     | helical                         | LL     | liquid limit              | NB       | Northbound                    | Prestr  | prestressed                |
| H       | henry                           | L      | litre                     | No. or # | number                        | Pvt     | private                    |
| Hz      | hertz                           | Lm     | loam                      | Obsc     | obscure(d)                    | PD      | private drive              |
| HDPE    | high density polyethylene       | Loc    | location                  | Obsn     | observation                   | Prod.   | production/produce         |
| HM      | high mast                       | LC     | long chord                | Ocpd     | occupied                      | Prog    | programmed                 |
| HP      | high pressure                   | Long.  | longitude                 | Ocpy     | occupy                        | Prop.   | property                   |
| HPS     | high pressure sodium            | Lp     | loop                      | Off Loc  | office location               | Prop Ln | property line              |
| Hwy     | highway                         | LD     | loop detector             | O/s      | offset                        | Ppsd    | proposed                   |
| Hor     | horizontal                      | Lm     | lumen                     | OC       | on center                     | PB      | pull box                   |
| HBP     | hot bituminous pavement         | Lum    | luminaire                 | C        | one dimensional consolidation |         |                            |
| HMA     | hot mix asphalt                 | L Sum  | lump sum                  | OC       | organic content               |         |                            |
| Hr      | hour(s)                         | Lx     | lux                       | Orig     | original                      |         |                            |
| Hyd     | hydrant                         | ML     | main line                 | O To O   | out to out                    |         |                            |
| Ph      | hydrogen ion content            | M Hr   | man hour                  | OD       | outside diameter              |         |                            |
| Id      | identification                  | MH     | manhole                   | OH       | overhead                      |         |                            |
| In or " | inch                            | Mkd    | marked                    | PMT      | pad mounted transformer       |         |                            |
| Incl    | inclinometer tube               | Mkr    | marker                    | Pg       | pages                         |         |                            |
| IMH     | inlet manhole                   | Mkg    | marking                   | Pntd     | painted                       |         |                            |
| ID      | inside diameter                 | MA     | mast arm                  | Pr       | pair                          |         |                            |
| Inst    | instrument                      | Matl   | material                  | Pnl      | panel                         |         |                            |
| Intchg  | interchange                     | Max    | maximum                   | Pk       | park                          |         |                            |
| Intmdt  | intermediate                    | MC     | meander corner            | PK       | Parker-Kalon nail             |         |                            |
| Intscn  | intersection                    | Meas   | measure                   | Pa       | pascal                        |         |                            |
| Inv     | invert                          | Mdn    | median                    | PSD      | passing sight distance        |         |                            |
| IM      | iron monument                   | MD     | median drain              | Pvmt     | pavement                      |         |                            |

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|           |                                    |           |                            |         |                                    |      |                       |
|-----------|------------------------------------|-----------|----------------------------|---------|------------------------------------|------|-----------------------|
| Qty       | quantity                           | SN        | sign number                | Tan     | tangent                            | Wb   | weber                 |
| Qtr       | quarter                            | Sig       | signal                     | T       | tangent (semi)                     | WIM  | weigh in motion       |
| Rad or R  | radius                             | Si Cl     | silt clay                  | TS      | tangent to spiral                  | W    | west                  |
| RR        | railroad                           | Si Cl Lm  | silty clay loam            | Tel     | telephone                          | WB   | westbound             |
| Rlwy      | railway                            | Si Lm     | silty loam                 | Tel B   | Telephone Booth                    | Wrng | wiring                |
| Rsd       | raised                             | Sgl       | single                     | Tel P   | telephone pole                     | W/   | with                  |
| RTP       | random traverse point              | SC        | slow curing                | Tv      | television                         | W/o  | without               |
| Rge or R  | range                              | SS        | slow setting               | Temp    | temperature                        | WC   | witness corner        |
| RC        | rapid curing                       | Sm        | small                      | Temp    | temporary                          | WGS  | world geodetic system |
| Rec       | record                             | S         | South                      | TBM     | temporary bench mark               | Z    | zenith                |
| Rcy       | recycle                            | SE        | South East                 | T       | tesla                              |      |                       |
| RAP       | recycled asphalt pavement          | SW        | South West                 | T       | thinwall tube sample               |      |                       |
| RPCC      | recycled portland cement concrete  | SB        | Southbound                 | T/mi    | tons per mile                      |      |                       |
| Ref       | reference                          | Sp        | spaces                     | Ts      | topsoil                            |      |                       |
| R Mkr     | reference marker                   | Spcl      | special                    | Tw or T | township                           |      |                       |
| RM        | reference monument                 | SA        | special assembly           | Traf    | traffic                            |      |                       |
| Refl      | reflectorized                      | SP        | special provisions         | TSCB    | traffic signal control box         |      |                       |
| RCB       | reinforced concrete box            | G         | specific gravity           | Tr      | trail                              |      |                       |
| RCES      | reinforced concrete end section    | Spk       | spike                      | Transf  | transformer                        |      |                       |
| RCP       | reinforced concrete pipe           | SC        | spiral to curve            | TB      | transit book                       |      |                       |
| RCPS      | reinforced concrete pipe sewer     | ST        | spiral to tangent          | Trans   | transition                         |      |                       |
| Reinf     | reinforcement                      | SB        | split barrel sample        | TT      | transmission tower                 |      |                       |
| Res       | reservation                        | SH        | sprinkler head             | Trans   | transverse                         |      |                       |
| Ret       | retaining                          | SV        | sprinkler valve            | Trav    | traverse                           |      |                       |
| Rev       | reverse                            | Sq        | square                     | TP      | traverse point                     |      |                       |
| Rt        | right                              | SF        | square feet                | Trtd    | treated                            |      |                       |
| R/W       | right of way                       | Km2       | square kilometer           | Trmt    | treatment                          |      |                       |
| Riv       | river                              | M2        | square meter               | Qc      | triaxial compression               |      |                       |
| Rd        | road                               | SY        | square yard                | TERO    | tribal employment rights ordinance |      |                       |
| Rdbd      | road bed                           | Stk       | stake                      | Tpl     | triple                             |      |                       |
| Rdwy      | roadway                            | Std       | standard                   | TP      | turning point                      |      |                       |
| RWIS      | roadway weather information system | N         | standard penetration test  | Typ     | typical                            |      |                       |
| Rk        | rock                               | Std Specs | standard specifications    | Qu      | unconfined compressive strength    |      |                       |
| Rt        | route                              | Sta       | station                    | Ugrnd   | underground                        |      |                       |
| Salv      | salvage(d)                         | Sta Yd    | station yards              | USC&G   | US Coast & Geodetic Survey         |      |                       |
| Sd        | sand                               | Stm L     | steam line                 | USGS    | US Geologic Survey                 |      |                       |
| Sdy Cl    | sandy clay                         | SEC       | steel encased concrete     | Util    | utility                            |      |                       |
| Sdy Cl Lm | sandy clay loam                    | SMA       | stone matrix asphalt       | VG      | valley gutter                      |      |                       |
| Sdy Fl    | sandy fill                         | SSD       | stopping sight distance    | Vap     | vapor                              |      |                       |
| Sdy Lm    | sandy loam                         | SD        | storm drain                | Vert    | vertical                           |      |                       |
| San       | sanitary sewer line                | St        | street                     | VC      | vertical curve                     |      |                       |
| Sc        | scoria                             | SPP       | structural plate pipe      | VCP     | vitrified clay pipe                |      |                       |
| Sec       | seconds                            | SPPA      | structural plate pipe arch | V       | volt                               |      |                       |
| Sec       | section                            | Str       | structure                  | Vol     | volume                             |      |                       |
| SL        | section line                       | Subd      | subdivision                | Wkwy    | walkway                            |      |                       |
| Sep       | separation                         | Sub       | subgrade                   | W       | water content                      |      |                       |
| Seq       | sequence                           | Sub Prep  | subgrade preperation       | WGV     | water gate valve                   |      |                       |
| Serv      | service                            | Ss        | subsoil                    | WL      | water line                         |      |                       |
| Sh        | shale                              | SE        | superelevation             | WM      | water main                         |      |                       |
| Sht       | sheet                              | SS        | supplement specification   | WMV     | water main valve                   |      |                       |
| Shtng     | sheeting                           | Supp      | supplemental               | W Mtr   | water meter                        |      |                       |
| Shldr     | shoulder                           | Surf      | surfacing                  | WSV     | water service valve                |      |                       |
| Sw        | sidewalk                           | Surv      | survey                     | WW      | water well                         |      |                       |
| S         | siemens                            | Sym       | symmetrical                | W       | watt                               |      |                       |
| SD        | sight distance                     | SI        | systems international      | Wrng    | wearing                            |      |                       |

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

|                    |   |                    |   |                    |   |
|--------------------|---|--------------------|---|--------------------|---|
| 702COM             | 702 Communications                        | GT PLNS NAT GAS    | Great Plains Natural Gas Company                  | RED RIV TEL        | Red River Rural Telephone                   |
| ACCENT             | Accent Communications                     | HALS TEL           | Halstad Telephone Company                         | RESVTN TEL         | Reservation Telephone                       |
| AGASSIZ WU         | Agassiz Water Users Incorporated          | IDEA1              | Idea1   | ROBRTS TEL         | Roberts Company Telephone                   |
| AGC                | Associated General Contractors of America | INT-COMM TEL       | Inter-Community Telephone Company                 | R-RIDER ELEC       | Roughrider Electric Coop                    |
| All PI             | Alliance Pipeline                         | KANEB PL           | Kaneb Pipeline Company                            | RRVW               | Red River Valley & Western Railroad         |
| ALL SEAS WU        | All Seasons Water Users Association       | KEM ELEC           | Kem Electric Cooperative Incorporated             | RSR ELEC           | R.S.R. Electric Cooperative                 |
| AMOCO PI           | Amoco Pipeline Company                    | KOCH GATH SYS      | Koch Gathering Systems Incorporated               | S E W U            | South East Water Users Incorporated         |
| AMRDA HESS         | Amerada Hess Corporation                  | LKHD PL            | Lakehead Pipeline Company                         | SCOTT CABLE        | Scott Cable Television Dickinson            |
| AT&T               | AT&T Corporation                          | LNGDN RWU          | Langdon Rural Water Users Incorporated            | SHERDN ELEC        | Sheridan Electric Cooperative               |
| B PAW              | Bear Paw Energy Incorporated              | LWR YELL R ELEC    | Lower Yellowstone Rural Electric                  | SHEYN VLY ELEC     | Sheyenne Valley Electric Cooperative        |
| BAKER ELEC         | Baker Electric                            | MCKNZ CON          | McKenzie Consolidated Telcom                      | SKYTECH            | Skyland Technologies Incorporated           |
| BASIN ELEC         | Basin Electric Cooperative Incorporated   | MCKNZ ELEC         | McKenzie Electric Cooperative                     | SLOPE ELEC         | Slope Electric Cooperative Incorporated     |
| BEK TEL            | Bek Communications Cooperative            | MCKNZ WRD          | McKenzie County Water Resource District           | SOURIS RIV TELCOM  | Souris River Telecommunications             |
| BELLE PL           | Belle Fourche Pipeline Company            | MCLEOD             | McLeod USA  | ST WAT COMM        | State Water Commission                      |
| BLM                | Bureau of Land Management                 | MCLN ELEC          | McLean Electric Cooperative                       | STATE LN WATER     | State Line Water Cooperative                |
| BNSF               | Burlington Northern Santa Fe Railway      | MCLN-SHRDN R WAT   | McLean-Sheridan Rural Water                       | STER ENG           | Sterling Energy                             |
| BOEING             | Boeing                                    | MDU                | Montana-dakota Utilities                          | STUT RWU           | Stutsman Rural Water Users                  |
| BRNS RWD           | Barnes Rural Water District               | MID-CONT CABLE     | Mid-Continent Cable                               | SW PL PRJ          | Southwest Pipeline Project                  |
| BURK-DIV ELEC      | Burke-Divide Electric Cooperative         | MIDSTATE TEL       | Midstate Telephone Company                        | T M C              | Turtle Mountain Communications              |
| BURL WU            | Burleigh Water Users                      | MINOT CABLE        | Minot Cable Television                            | TCI                | TCI of North Dakota                         |
| Cable One          | Cable One                                 | MINOT TEL          | Minot Telephone Company                           | TESORO HGH PLNS PL | Tesoro High Plains Pipeline                 |
| CABLE SERV         | Cable Services                            | MISS W W S         | Missouri West Water System                        | TRI-CNTY WU        | Tri-County Water Users Incorporated         |
| CAP ELEC           | Capital Electric Cooperative Incorporat   | MNKOTA PWR         | Minnkota Power                                    | TRL CO RWU         | Traill County Rural Water Users             |
| CASS CO ELEC       | Cass County Electric Cooperative          | MOR-GRAN-SOU ELEC  | Mor-gran-sou Electric Cooperative                 | UNTD TEL           | United Telephone                            |
| CASS RWU           | Cass Rural Water Users Incorporated       | MOUNT-WILLI ELEC   | Mountrail-williams Electric Cooperative           | UPPR SOUR WUA      | Upper Souris Water Users Association        |
| CAV ELEC           | Cavalier Rural Electric Cooperative       | MRE LBTY TEL       | Moore & Liberty Telephone                         | US SPRINT          | U.S. Sprint                                 |
| CBLCOM             | Cablecom Of Fargo                         | MUNICIPAL          | City Water And Sewer                              | USAF MSL CABLE     | U.S.A.F. Missile Cable                      |
| CENEX PL           | Cenex Pipeline                            | MUNICIPAL          | City Of '.....'                                   | USFWS              | US Fish and Wildlife Service                |
| CENT PL WATER DIST | Central Pipe Line Water District          | N CENT ELEC        | North Central Electric Cooperative                | USW COMM           | U.S. West Communications                    |
| CENT PWR ELEC      | Central Power Electric Cooperative        | N VALL W DIST      | North Valley Water District                       | VRNDRY ELEC        | Verendrye Electric Cooperative              |
| COE                | Corps of Engineers                        | ND PKS & REC       | North Dakota Parks And Recreation                 | W RIV TEL          | West River Telephone Incorporated           |
| CONS TEL           | Consolidated Telephone                    | ND TEL             | North Dakota Telephone Company                    | WEB                | W. E. B. Water Development Association      |
| CONT RES           | Continental Resource Inc                  | NDDOT              | North Dakota Department of Transportation         | WILLI RWA          | Williams Rural Water Association            |
| CPR                | Canadian Pacific Railway                  | NDSU SOIL SCI DEPT | NDSU Soil Science Department                      | WILSTN BAS PL      | Williston Basin Interstate Pipeline Company |
| D O E              | Department Of Energy                      | NEMONT TEL         | Nemont Telephone                                  | WLSH RWD           | Walsh Water Rural Water District            |
| DAK CARR           | Dakota Carrier Network                    | NODAK R ELEC       | Nodak Rural Electric Cooperative                  | WOLVRTN TEL        | Wolverton Telephone                         |
| DAK CENT TEL       | Dakota Central Telephone                  | NOON FRMS TEL      | Noonan Farmers Telephone Company                  | XLENER             | Xcel Energy                                 |
| DAK RWD            | Dakota Rural Water District               | NPR                | Northern Plains Railroad                          | YSVR               | Yellowstone Valley Railroad                 |
| DGC                | Dakota Gasification Company               | NSP                | Northern States Power                             |                    |   |
| DICKEY R NET       | Dickey Rural Networks                     | NTH PRAIR RW       | Northern Prairie Rural Water Association          |                    |   |
| DICKEY RWU         | Dickey Rural Water Users Association      | NTHN BRDR PL       | Northern Border Pipeline                          |                    |   |
| DICKEY TEL         | Dickey Telephone                          | NTHN PLNS ELEC     | Northern Plains Electric Cooperative Incorporated |                    |   |
| DNRR               | Dakota Northern Railroad                  | NTHWSTRN REF       | Northwestern Refinery Company                     |                    |   |
| DOME PL            | Dome Pipeline Company                     | NW COMM            | Northwest Communication Cooperation               |                    |   |
| DVELEC             | Dakota Valley Electric Cooperative        | ONEOK              | Oneok gas   |                    |   |
| DVMW               | Dakota, Missouri Valley & Western         | OSHA               | Occupational Safety and Health Administration     |                    |   |
| ENBRDG             | Enbridge Pipelines Incorporated           | OTTR TL PWR        | Otter Tail Power Company                          |                    |   |
| ENVENTIS           | Enventis Telephone                        | P L E M            | Prairielands Energy Marketing                     |                    |   |
| FALK MNG           | Falkirk Mining Company                    | POLAR COM          | Polar Communications                              |                    |   |
| FHWA               | Federal Highway Administration            | PVT ELEC           | Private Electric                                  |                    |   |
| G FKS-TRL WD       | Grand Forks-trail Water District          | QWEST              | Qwest Communications                              |                    |   |
| GETTY TRD & TRAN   | Getty Trading & Transportation            | R&T W SUPPLY       | R & T Water Supply Association                    |                    |   |
| GLDN W ELEC        | Golden West Electric Cooperative          | RAMSEY R SEW       | Ramsey Rural Sewer Association                    |                    |   |
| GRGS CO TEL        | Griggs County Telephone                   | RAMSEY RW          | Ramsey Rural Water Association                    |                    |   |
|                    |   | RAMSEY UTIL        | Ramsey County Rural Utilities                     |                    |   |

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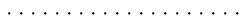




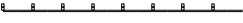
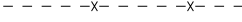
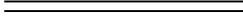
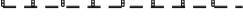


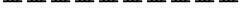
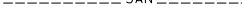



























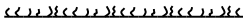

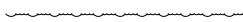

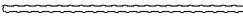

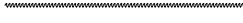

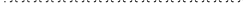






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Line Styles

|  |   |  |  |  |   |  |                                       |
|--|---|--|--|--|---|--|---------------------------------------|
|  | Limits of Const Transition Line           |  | Floating Silt Curtain                    |  | Existing Aggregate (Cross Section View)       |  | Existing Centerline                   |
|  | Bale Check                                |  | Existing Telephone Line                  |  | Existing Curb and Gutter (Cross Section View) |  | Supplemental Contour                  |
|  | Rock Check                                |  | Existing TV Line                         |  | Existing Riprap                               |  | Right of Way                          |
|  | Sight Distance Triangle Line              |  | Existing Assumed Ground (Not Surveyed)   |  | Existing Underground Vault or Lift Station    |  | Existing Right of Way                 |
|  | Small Hidden Object                       |  | Tentative Ground Line                    |  | Tangent Line                                  |  | Existing Right of Way Railroad        |
|  | Dimension Leader                          |  | Existing Water or Steam Line             |  | Hidden Object                                 |  | Failure Line                          |
|  | Existing Ground                           |  | Existing Under Drain                     |  | Existing Dirt Surface                         |  | Existing Conditions                   |
|  | Existing Topsoil (Cross Section View)     |  | Under Drain                              |  | Existing Conduit                              |  | Existing Ground (Details)             |
|  | Large Hidden Object                       |  | Wall                                     |  | Topsoil Profile                               |  | Existing Sixteenth Section Line       |
|  | Edge Drain                                |  | Existing Slotted Drain                   |  | Existing Conductor                            |  | Existing Right of Way Not State Owned |
|  | Geotextile Fabric Type D                  |  | Existing Cemetary Boundary               |  | Conductor                                     |  | Phantom Object                        |
|  | Existing Electrical                       |  | Centerline Pavement Marking              |  | Fiber Optic                                   |  | Centerline Main                       |
|  | Existing Fiber Optic Line                 |  | Barrier with Centerline Pavement Marking |  | Existing Loop Detector                        |  | Existing Guardrail Cable              |
|  | Existing TV Fiber Optic                   |  | Barrier Pavement Marking                 |  | Subgrade, Subcut or Ditch Grade               |  | Existing Guardrail Metal              |
|  | Existing Gas Pipe                         |  | Stripe 4 IN Dotted Extension White       |  | Existing Asphalt Surface                      |  | Existing Edge of Water                |
|  | Geogrid                                   |  | Stripe 8 IN Dotted Extension White       |  | Existing Asphalt (Cross Section View)         |  | Excavation Limits                     |
|  | Existing Overhead Utility Line            |  | Stripe 8 IN Lane Drop                    |  | Existing Reinforcement Rebar                  |  | Existing Government Lot Line          |
|  | Existing Power                            |  | Wetland Mitigation                       |  | Existing Tie Point Line                       |  | Existing Adjacent Block Lines         |
|  | Existing Fuel Pipeline                    |  | Existing Box Culvert Bridge              |  | Existing State or International Line          |  | Existing Adjacent Lot Lines           |
|  | Existing Undefined Above Ground Pipe Line |  | Existing Concrete Surface                |  | Existing Quarter Section Line                 |  | Existing Adjacent Property Line       |
|  | Geotextile Fabric Type R                  |  | Existing Drainage Structure              |  | Existing County                               |  | Existing Adjacent Subdivision Lines   |
|  | Geotextile Fabric Type R1                 |  | Easement                                 |  | Existing Section Line                         |  |                                       |
|  | Remove Line                               |  | Existing Concrete                        |  | Existing Township                             |  |                                       |
|  | Geotextile Fabric Type RR                 |  | Existing Easement                        |  | Existing Railroad Centerline                  |  |                                       |
|  | Geotextile Fabric Type S                  |  | Existing Gravel Surface                  |  | Centerline                                    |  |                                       |

|  |        |  |
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Line Styles

|   |   |   |  |   |                                      |
|---|---|---|--|---|--------------------------------------|
|    | Subgrade Reinforcement                      |    | Existing Railroad Switch                               |  | Sheet Piling                         |
|    | Existing Down Guy Wire Down Guy             |    | Overhead Sign Structure Cantilever                     |  | W-Beam w Posts                       |
|    | Existing Fence                              |    | 24 Inch Pipe   |  | Existing W-Beam Guardrail with Posts |
|    | Existing Railroad                           |    | Reinforced Concrete Pipe                               |  | Exst Wet Area-Vegetation Break       |
|    | Existing Sanitary Sewer                     |    | Signal Head with Mast Arm                              |  | Existing Wetland Delineated          |
|    | Existing Sanitary Force Main                |    | Existing Signal Head with Mast Arm                     |   |                                      |
|    | Existing Storm Drain                        |    | Tie Bar at Random Spacing                              |   |                                      |
|    | Existing Storm Drain Force Main             |    | 3-Cable w Posts  |   |                                      |
|    | Fence                                       |    | Existing 3-Cable w Posts                               |   |                                      |
|    | Silt Fence                                  |    | Site Boundary  |   |                                      |
|    | Existing Field Line                         |    | Fiber Rolls  |   |                                      |
|    | Exst Flow                                   |    | Doweled Joint  |   |                                      |
|  | Flow  |  | Tie Bar 30 Inch 4 Foot Center to Center                |   |                                      |
|  | Existing Culvert                            |  | Tie Bar 18 Inch 3 Foot Center to Center                |   |                                      |
|  | Existing Curb                               |  | Existing Berm, Dike, Pit, or Earth Dam                 |   |                                      |
|  | Existing Valley Gutter                      |  | Existing Ditch Block                                   |   |                                      |
|  | Existing Driveway Gutter                    |  | Depression Contours                                    |   |                                      |
|  | Existing Curb and Gutter                    |  | Existing City Corporate Limits or Reservation Boundary |   |                                      |
|  | Existing Mountable Curb and Gutter          |  | Gravel Pit - Borrow Area                               |   |                                      |
|  | Existing Double Micro Loop Detector         |  | Existing Tree Boundary                                 |   |                                      |
|  | Micro Loop Detector Double                  |  | Tree Row   |   |                                      |
|  | Existing Overhead Sign Structure            |  | Existing Brush or Shrub Boundary                       |   |                                      |
|  | Existing Micro Loop Detector                |  | Existing Retaining Wall                                |   |                                      |
|  | Micro Loop Detector                         |  | Existing Planter or Wall                               |   |                                      |
|  | Existing Overhead Sign Structure Cantilever |  | Retaining Wall (Plan View)                             |   |                                      |

|  |        |   |
|--|--------|---|
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Symbols

|  | North Arrow (Half Scale)             |  | Attenuation Device              |  | Existing Railroad Battery Box          |   | Existing Delineator Type E                |  |  |          |  |           |  |      |        |  |  |
|--|--------------------------------------|--|---------------------------------|--|--|---|---|--|--|----------|--|-----------|--|------|--------|--|--|
|  | Truck Mounted Attenuator             |  | Diamond Grade Delineator Type A |  | Existing Bush or Shrub                 |   | Existing EFB Misc                         |  |  |          |  |           |  |      |        |  |  |
|  | Type I Barricade                     |  | Diamond Grade Delineator Type B |  | Existing Gas Cap or Stub               |   | Existing Flashing Beacon                  |  |  |          |  |           |  |      |        |  |  |
|  | Type II Barricade                    |  | Diamond Grade Delineator Type C |  | Existing Sanitary Cap or Stub          |   | Existing Pipe Mounted Flasher             |  |  |          |  |           |  |      |        |  |  |
|  | Type III Barricade                   |  | Diamond Grade Delineator Type D |  | Existing Storm Drain Cap or Stub       |   | Existing Pad Mounted Feed Point           |  |  |          |  |           |  |      |        |  |  |
|  | Catch Basin                          |  | Diamond Grade Delineator Type E |  | Existing Water Cap or Stub             |   | Existing Pipe Mounted Feed Point with Pad |  |  |          |  |           |  |      |        |  |  |
|  | Caim or Stone Circle                 |  | Flexible Delineator             |  | Existing Sanitary Cleanout             |   | Existing Pole Mounted Feed Point          |  |  |          |  |           |  |      |        |  |  |
|  | Video Detection Camera               |  | Flexible Delineator Type A      |  | Existing Concrete Foundation           |   | Existing Railroad Frog                    |  |  |          |  |           |  |      |        |  |  |
|  | Storm Drain Cap or Stub              |  | Flexible Delineator Type B      |  | Existing Traffic Signal Controller     |   | Existing Snow Gate 18                     |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 18 Inch |  | Flexible Delineator Type C      |  | Existing Pad Mounted Signal Controller |   | Existing Snow Gate 28                     |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 24 Inch |  | Flexible Delineator Type D      |  | Existing Sixteenth Section Corner      |   | Existing Snow Gate 40                     |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 30 Inch |  | Flexible Delineator Type E      |  | Existing Quarter Section Corner        |   | Existing Headwall                         |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 36 Inch |  | Delineator Type A               |  | Existing Section Corner                |   | Existing Pedestrian Head with Number      |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 42 Inch |  | Delineator Type A Reset         |  | Existing Railroad Crossbuck            |   | Existing Signal Head                      |  |  |          |  |           |  |      |        |  |  |
|  | Corrugated Metal End Section 48 Inch |  | Delineator Type B               |  | Existing Satellite Dish                |   | Existing Sprinkler Head                   |  |  |          |  |           |  |      |        |  |  |
|  | Concrete Foundation                  |  | Delineator Type B Reset         |  | Existing Fuel Dispensers               |   | Existing Fire Hydrant                     |  |  |          |  |           |  |      |        |  |  |
|  | Ground Connection Conductor          |  | Delineator Type C               |  | Existing Flexible Delineator Type A    |   | Existing Catch Basin Drop Inlet           |  |  |          |  |           |  |      |        |  |  |
|  | Neutral Connection Conductor         |  | Delineator Type D               |  | Existing Flexible Delineator Type B    |   | Existing Curb Inlet                       |  |  |          |  |           |  |      |        |  |  |
|  | Phase 1 Connection Conductor         |  | Delineator Type E               |  | Existing Flexible Delineator Type C    |   | Existing Manhole Inlet                    |  |  |          |  |           |  |      |        |  |  |
|  | Phase 2 Connection Conductor         |  | Delineator Drums                |  | Existing Flexible Delineator Type D    |   | Existing Junction Box                     |  |  |          |  |           |  |      |        |  |  |
|  | Traffic Cone                         |  | Spot Elevation                  |  | Existing Flexible Delineator Type E    | <table><tr><th colspan="2">NORTH DAKOTA<br/>DEPARTMENT OF TRANSPORTATION</th></tr><tr><th colspan="2">07-01-14</th></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr></table> |   | NORTH DAKOTA<br>DEPARTMENT OF TRANSPORTATION |  | 07-01-14 |  | REVISIONS |  | DATE | CHANGE |  |  |
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|  |                                      |  |                                 |  |  |   |   |  |  |          |  |           |  |      |        |  |  |
|  | Signal Controller                    |  | Existing Access Control Arrow   |  | Existing Delineator Type A             |   |   |  |  |          |  |           |  |      |        |  |  |
|  | Pad Mounted Signal Controller        |  | Existing Artifact               |  | Existing Delineator Type B             |   |   |  |  |          |  |           |  |      |        |  |  |
|  | Alignment Data Point                 |  | Existing Flashing Beacon        |  | Existing Delineator Type C             |   |   |  |  |          |  |           |  |      |        |  |  |
|  | Emergency Vehicle Detector           |  | Existing Benchmark              |  | Existing Delineator Type D             |   |   |  |  |          |  |           |  |      |        |  |  |

Symbols

D-101-31

|  |  |  |   |  |   |  |                                      |
|--|--|--|---|--|---|--|--------------------------------------|
|  | Existing Light Standard                            |  | Existing Manhole with Valve Water       |  | Existing Telephone Pole                         |  | Existing Undefined Manhole           |
|  | Existing High Mast Light Standard 10 Luminaire     |  | Existing Water Manhole                  |  | Existing Wood Pole                              |  | Existing Undefined Pull Box          |
|  | Existing High Mast Light Standard 3 Luminaire      |  | Existing Mile Post Type A               |  | Existing Post                                   |  | Existing Undefined Pedestal          |
|  | Existing High Mast Light Standard 4 Luminaire      |  | Existing Mile Post Type B               |  | Existing Pedestrian Push Button Post            |  | Existing Undefined Valve             |
|  | Existing High Mast Light Standard 5 Luminaire      |  | Existing Mile Post Type C               |  | Existing Control Point CP                       |  | Existing Undefined Pipe Vent         |
|  | Existing High Mast Light Standard 6 Luminaire      |  | Existing Reference Marker               |  | Existing Control Point GPS-RTK                  |  | Existing Gas Valve                   |
|  | Existing High Mast Light Standard 7 Luminaire      |  | Existing RW Marker                      |  | Existing Control Point TRI                      |  | Existing Water Valve                 |
|  | Existing High Mast Light Standard 8 Luminaire      |  | Existing Utility Marker                 |  | Existing Reference Marker Point NGS             |  | Existing Fuel Pipe Vent              |
|  | Existing High Mast Light Standard 9 Luminaire      |  | Iron Monument Found                     |  | Existing Pull Box                               |  | Existing Gas Pipe Vent               |
|  | Existing Overhead Sign Structure Load Center       |  | Iron Pin R/W Monument                   |  | Existing Intelligent Transportation Pull Box    |  | Existing Sanitary Pipe Vent          |
|  | Existing Luminaire                                 |  | Existing Object Marker Type I           |  | Existing Water Pump                             |  | Existing Storm Drain Pipe Vent       |
|  | Existing Light Standard Luminaire                  |  | Existing Object Marker Type II          |  | Existing Slotted Reinforced Concrete Pipe       |  | Existing Water Pipe Vent             |
|  | Existing Federal Mailbox                           |  | Existing Object Marker Type III         |  | Existing RR Profile Spot                        |  | Existing Weather Station             |
|  | Existing Private Mailbox                           |  | Existing Electrical Pedestal            |  | Existing Fuel Leak Sensors                      |  | Existing Ground Water Well Bore Hole |
|  | Existing Meander Section Corner                    |  | Existing Telephone Pedestal             |  | Existing Highway Sign                           |  | Existing Windmill or Tower           |
|  | Existing Meter                                     |  | Existing Fiber Optic Telephone Pedestal |  | Existing Miscellaneous Spot                     |  | Existing Witness Corner              |
|  | Existing Electrical Manhole                        |  | Existing TV Pedestal                    |  | Existing Lighting Standard Pole                 |  | Flashing Beacon                      |
|  | Existing Gas Manhole                               |  | Existing Fiber Optic TV Pedestal        |  | Existing Traffic Signal Standard                |  | Flagger                              |
|  | Existing Sanitary Manhole                          |  | Existing Fuel Filler Pipes              |  | Existing Transformer                            |  | Pipe Mounted Flasher                 |
|  | Existing Sanitary Force Main Manhole               |  | Existing Traverse PI Aerial Panel       |  | Existing Large Evergreen Tree                   |  | Sanitary Force Main with Valve       |
|  | Existing Sanitary Manhole with Valve               |  | Existing Pole                           |  | Existing Small Evergreen Tree                   |  |                                      |
|  | Existing Storm Drain Manhole                       |  | Existing Power Pole                     |  | Existing Large Tree                             |  |                                      |
|  | Existing Force Main Storm Drain Manhole            |  | Existing Power Pole with Transformer    |  | Existing Small Tree                             |  |                                      |
|  | Existing Force Main Storm Drain Manhole with Valve |  |   |  | Existing Tree Trunk                             |  |                                      |
|  | Existing Telephone Manhole                         |  |   |  | Existing Pad Mounted Traffic Signal Control Box |  |                                      |

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Symbols



Pad Mounted Feed Point



Pipe Mounted Feed Point with Pad



Pole Mounted Feed Point



Headwall



Double Headwall with Vegetation Barrier



Single Headwall with Vegetation Barrier



Pole Mounted Head



Sprinkler Head



Fire Hydrant



Inlet Type 1



Inlet Type 2



Double Inlet Type 2



Inlet Grate Type 2



Junction Box



High Mast Light Standard 10 Luminaire



High Mast Light Standard 3 Luminaire



High Mast Light Standard 4 Luminaire



High Mast Light Standard 5 Luminaire



High Mast Light Standard 6 Luminaire



High Mast Light Standard 7 Luminaire



High Mast Light Standard 8 Luminaire



High Mast Light Standard 9 Luminaire



Relocate Light Standard



Overhead Sign Structure Load Center



Light Standard 100 Watt High Pressure Sodium Vapor Luminaire



Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire



Light Standard 150 Watt High Pressure Sodium Vapor Luminaire



Light Standard 175 Watt High Pressure Sodium Vapor Luminaire



Light Standard 200 Watt High Pressure Sodium Vapor Luminaire



Light Standard 250 Watt High Pressure Sodium Vapor Luminaire



Light Standard 310 Watt High Pressure Sodium Vapor Luminaire



Light Standard 35 Watt High Pressure Sodium Vapor Luminaire



Light Standard 400 Watt High Pressure Sodium Vapor Luminaire



Light Standard 50 Watt High Pressure Sodium Vapor Luminaire



Light Standard 70 Watt High Pressure Sodium Vapor Luminaire



Light Standard 700 Watt High Pressure Sodium Vapor Luminaire



Manhole



Manhole 48 Inch



Sanitary Force Main Manhole



Sanitary Sewer Manhole



Storm Drain Manhole



Storm Drain Manhole with Inlet



Reset Mile Post



Mile Post Type A



Mile Post Type B



Mile Post Type C



Right of Way Marker



Tubular Marker



Alignment Monument



Iron Pin Reference Monument



Object Marker Type I



Object Marker Type II



Object Marker Type III



Caution Mode Arrow Panel



Back to Back Vertical Panel Sign



Double Direction Arrow Panel



Left Directional Arrow Panel



Right Directional Arrow Panel



Sequencing Arrow Panel



Truck Mounted Arrow Panel



Power Pole



Wood Pole



Pedestrian Push Button Post



Property Corner



Pull Box



Intelligent Transportation Pull Box



Sanitary Pump



Storm Drain Pump



Reinforced Pavement



Reinforced Concrete End Section 15 Inch



Reinforced Concrete End Section 18 Inch



Reinforced Concrete End Section 24 Inch



Reinforced Concrete End Section 30 Inch



Reinforced Concrete End Section 36 Inch



Reinforced Concrete End Section 42 Inch



Reinforced Concrete End Section 48 Inch



Reinforced Concrete End Section 54 Inch



Reset Right of Way Marker



Reset USGS Marker



Right of Way Markers



Riser 30 Inch



Continuous Split Barrel Sample



Flight Auger Sample



Split Barrel Sample



Thinwall Tube Sample



Highway Sign



SNOW GATE 18 FT



SNOW GATE 28 FT



SNOW GATE 40 FT



Standard Penetration Test



Transformer



Inclinometer Tube



Underdrain Cleanout



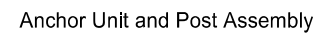
Excavation Unit



Water Valve

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Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

| Properties of Telescoping Perforated Tube |                    |                     |                      |                                    |                                  |                                  |
|---|--------------------|---------------------|----------------------|------------------------------------|----------------------------------|----------------------------------|
| Tube Size in.                             | Wall Thickness in. | U.S. Standard Gauge | Weight per Foot lbs. | Moment of Inertia in. <sup>4</sup> | Cross Sec. Area in. <sup>2</sup> | Section Modulus in. <sup>3</sup> |
| 1½ x 1½                                   | 0.105              | 12                  | 1.702                | 0.129                              | 0.380                            | 0.172                            |
| 2 x 2                                     | 0.105              | 12                  | 2.416                | 0.372                              | 0.590                            | 0.372                            |
| 2¼ x 2¼                                   | 0.105              | 12                  | 2.773                | 0.561                              | 0.695                            | 0.499                            |
| 2⅜ x 2⅜                                   | 0.135              | 10                  | 3.432                | 0.605                              | 0.841                            | 0.590                            |
| 2½ x 2½                                   | 0.105              | 12                  | 3.141                | 0.804                              | 0.803                            | 0.643                            |
| 2½ x 2½                                   | 0.135              | 10                  | 4.006                | 0.979                              | 1.010                            | 0.785                            |

| Square Post Sizes (B) | A   | B   | C   | D    | E    | F   |
|-----------------------|-----|-----|-----|------|------|-----|
| 2½" x 10 ga.          | 1⅝" | 2½" | 3½" | 25⅝" | 13⅝" | 1⅝" |
| 2½" x 10 ga.          | 1⅝" | 2½" | 3⅝" | 5⅝"  | 12⅝" | 1⅝" |

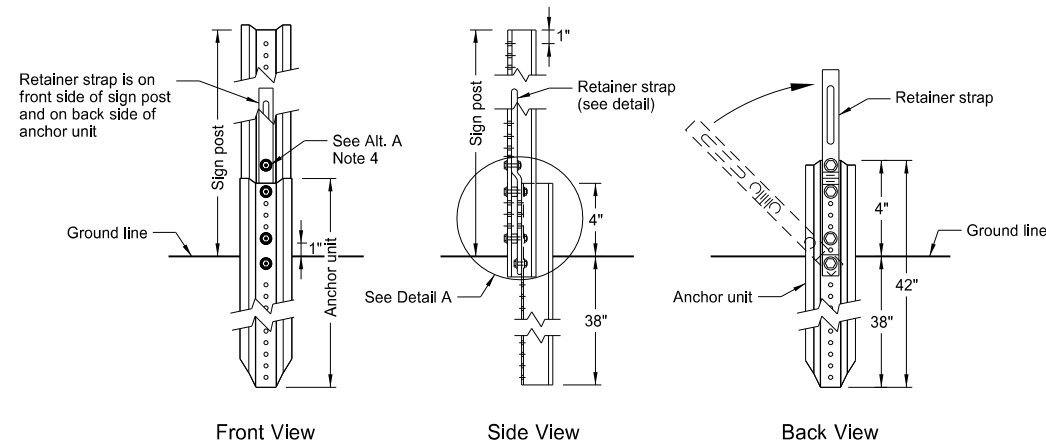
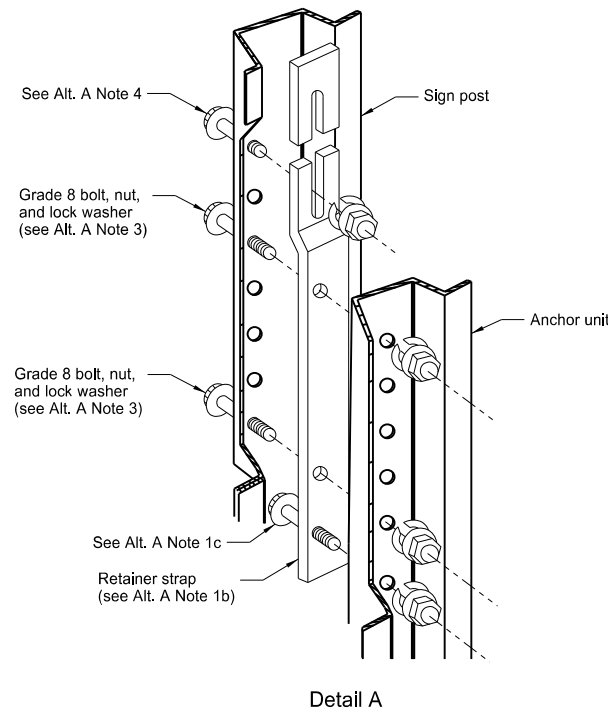
(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

(B) The  $2\frac{3}{16}$ "x10 ga. may be inserted into  $2\frac{1}{2}$ "x10 ga. for additional wind load.

|  |        |
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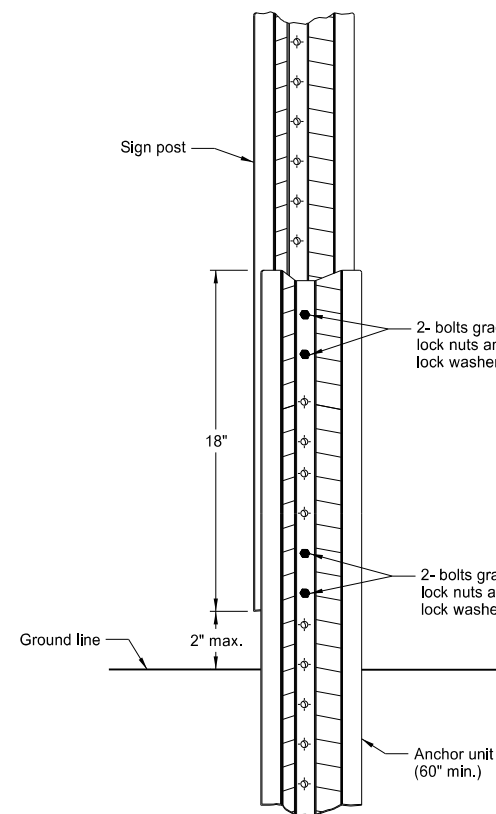
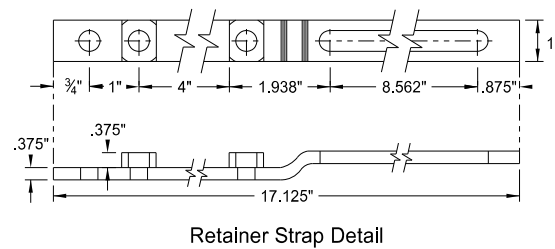
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U-Channel Post



Breakaway U-Channel Detail Alternate A

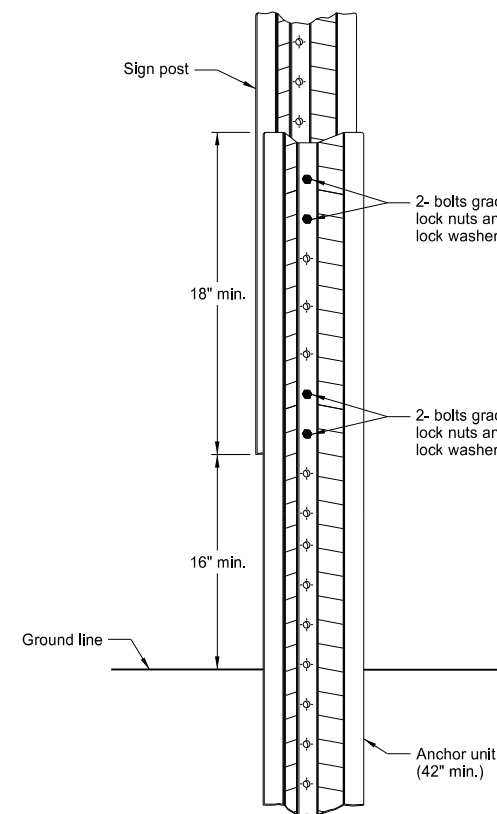
A maximum of 2 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail Alternate B

(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail Alternate C

(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

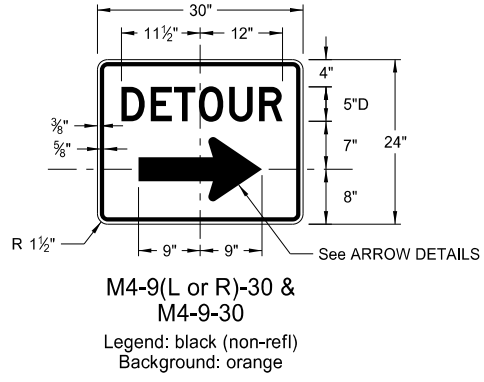
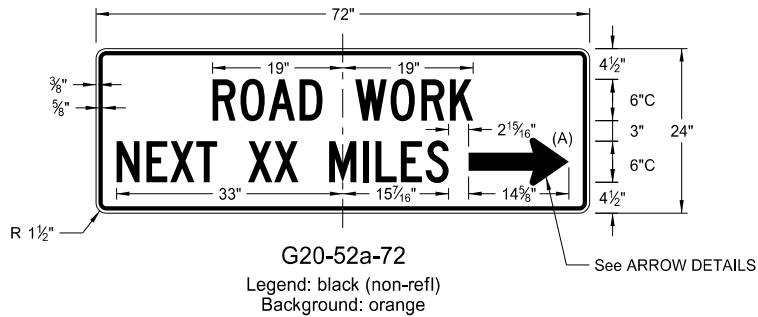
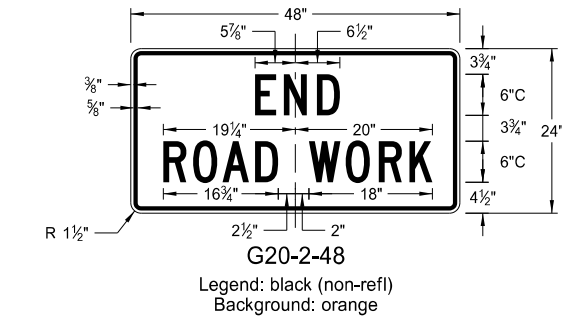
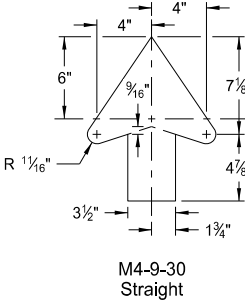
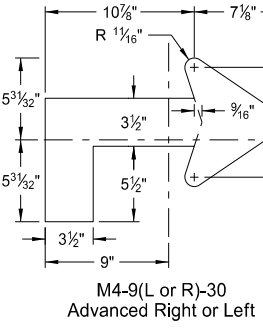
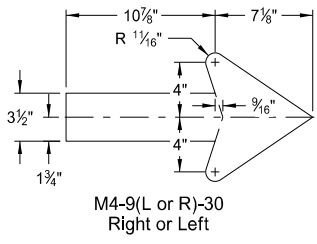
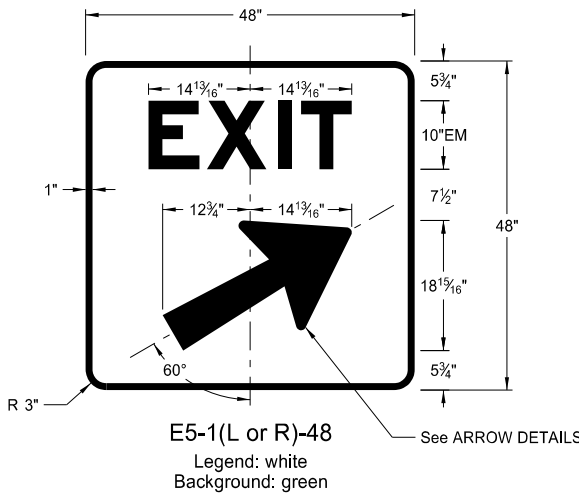
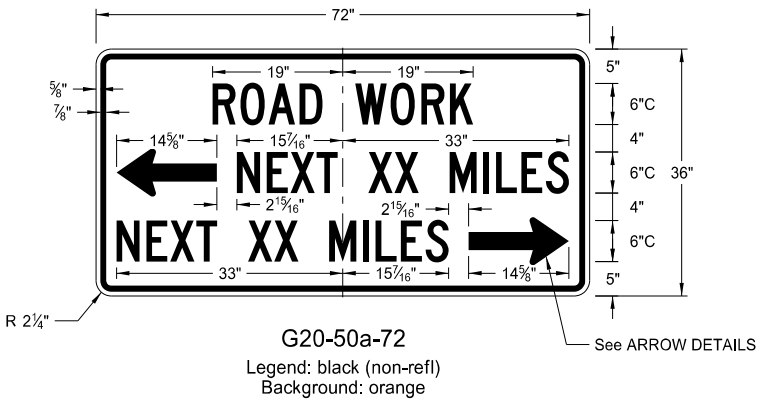
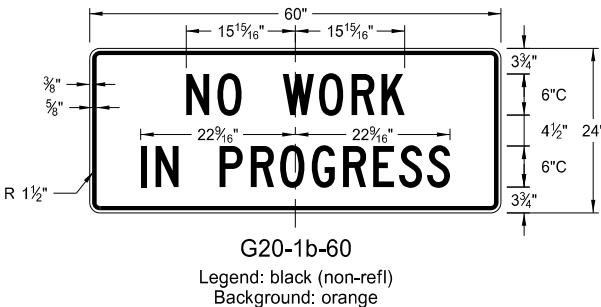
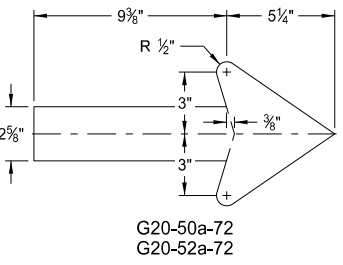
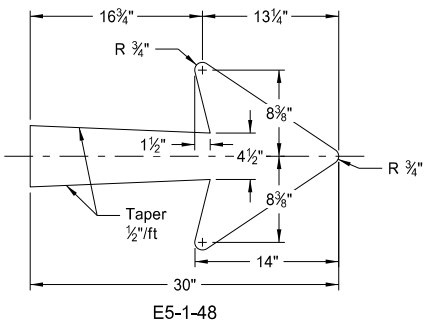
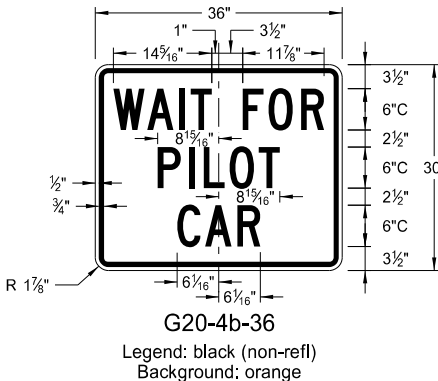
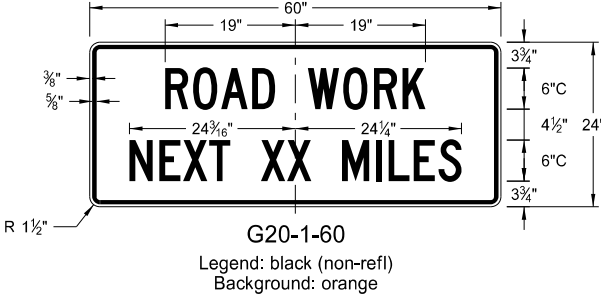
- a) Drive anchor unit to within 12" of ground level.  
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.  
c) Assemble strap to back of anchor unit using  $\frac{5}{16}$ "x2" bolt, lock washer and nut.  
d) Rotate strap 90° to left.
- a) Drive anchor unit to 4" above ground.  
b) Rotate strap to vertical position.
- a) Place  $\frac{5}{16}$ "x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.  
b) Alternately tighten two connector bolts.
- Complete assembly by tightening  $\frac{5}{16}$ "x2" bolt (this fastens sign post to retainer strap).
- The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

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CONSTRUCTION SIGN DETAILS  
TERMINAL AND GUIDE SIGNS

D-704-9



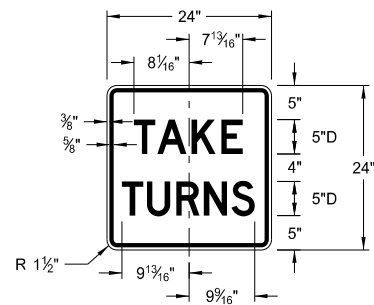
ARROW DETAILS

NOTES:  
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

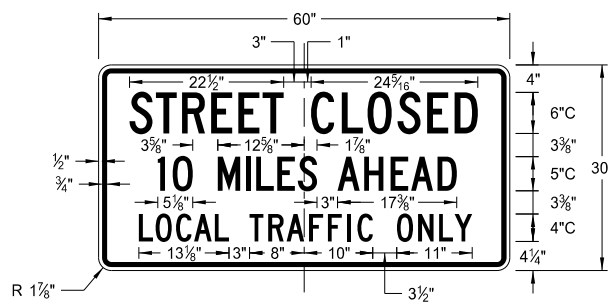
|  |        |  |
|--|--------|--|
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CONSTRUCTION SIGN DETAILS  
REGULATORY SIGNS

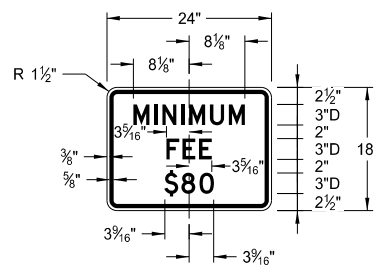
D-704-10



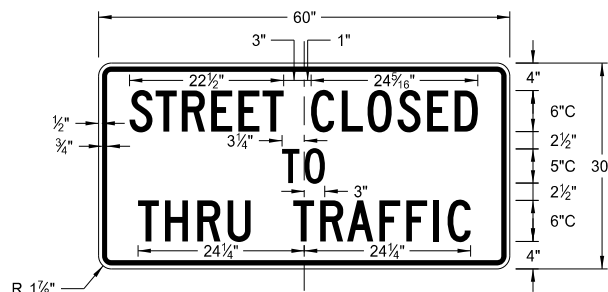
R1-50-24  
Legend: black (non-refl)  
Background: white



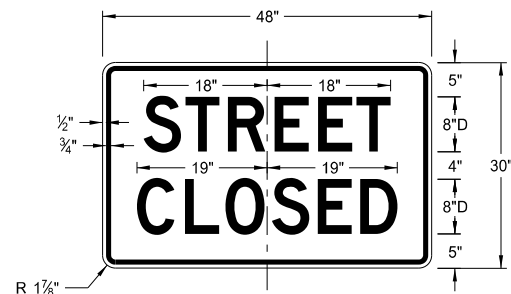
R11-3c-60  
Legend: black (non-refl)  
Background: white



R2-1a-24  
Legend: black (non-refl)  
Background: white



R11-4a-60  
Legend: black (non-refl)  
Background: white



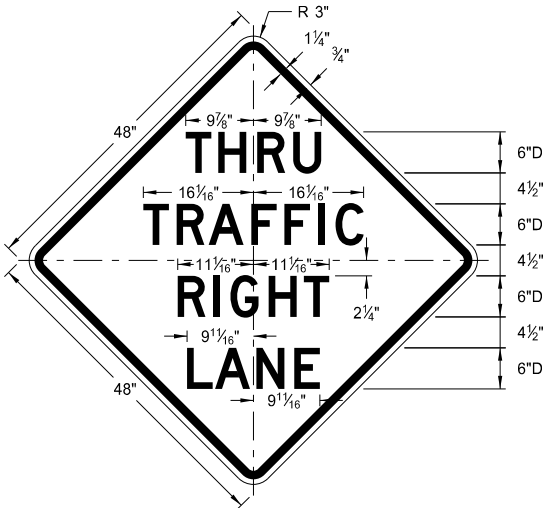
R11-2a-48  
Legend: black (non-refl)  
Background: white

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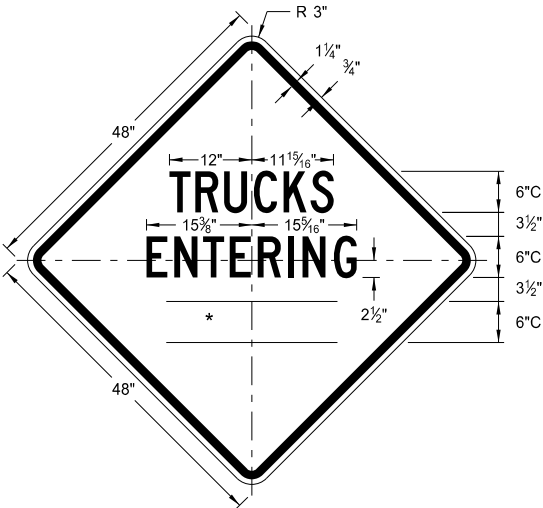
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CONSTRUCTION SIGN DETAILS  
WARNING SIGNS

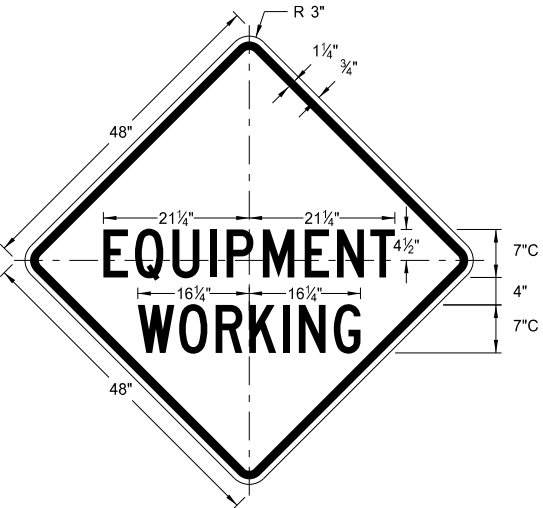
D-704-11



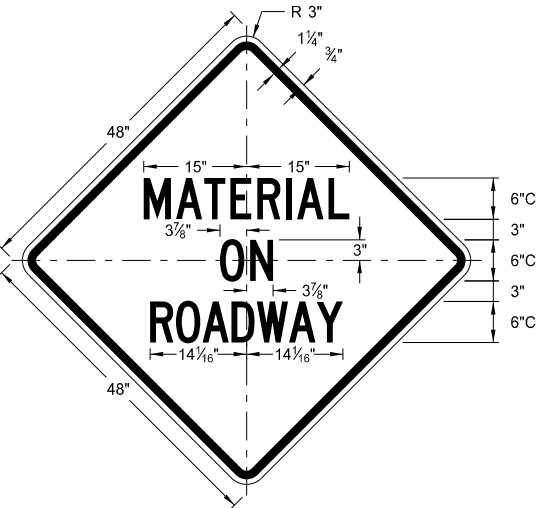
W5-8-48  
Legend: black (non-refl)  
Background: orange



W8-54-48  
Legend: black (non-refl)  
Background: orange



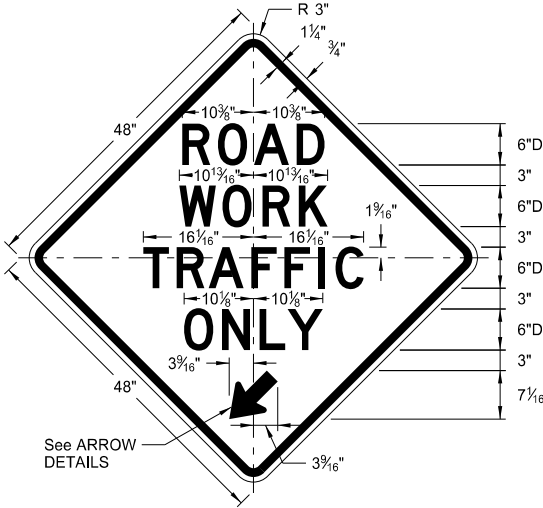
W20-51-48  
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Background: orange



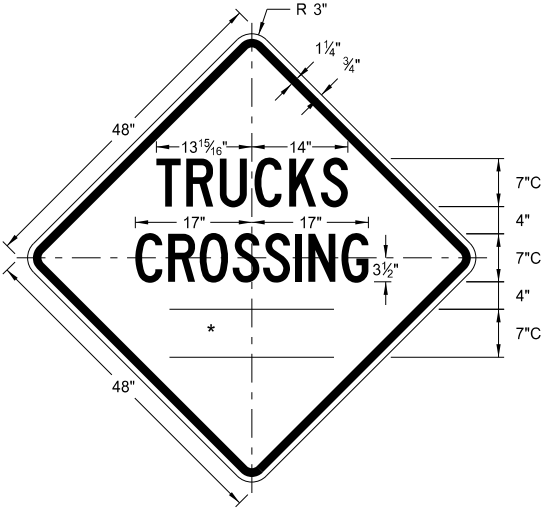
W21-51-48  
Legend: black (non-refl)  
Background: orange

| WORD     | LETTER SPACING |
|----------|----------------|
| AHEAD    | Standard       |
| 200 FT   | Standard       |
| 350 FT   | Standard       |
| 500 FT   | Standard       |
| 1000 FT  | Reduce 40%     |
| 1500 FT  | Reduce 40%     |
| 1/2 MILE | Reduce 50%     |
| 1 MILE   | Standard       |

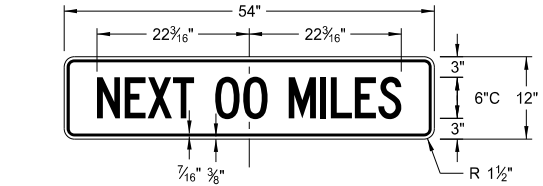
\* DISTANCE MESSAGES



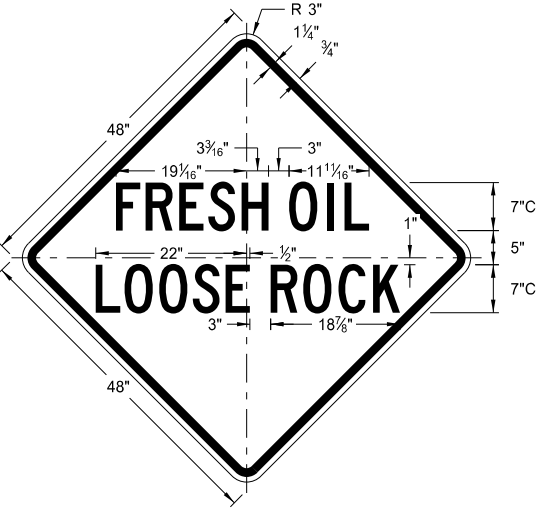
W5-9-48  
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Background: orange



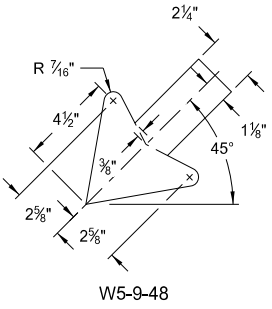
W8-55-48  
Legend: black (non-refl)  
Background: orange



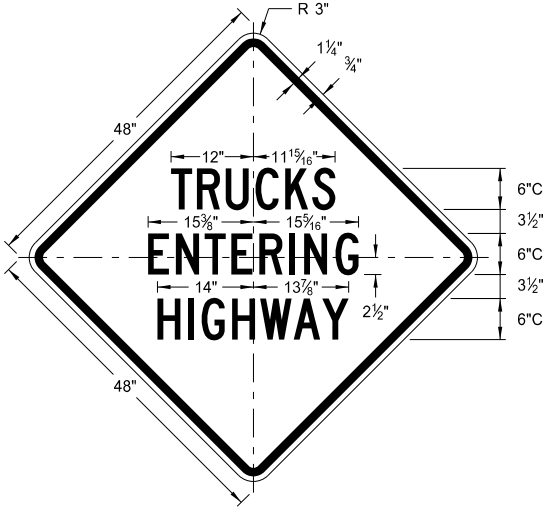
W20-52-54  
Legend: black (non-refl)  
Background: orange



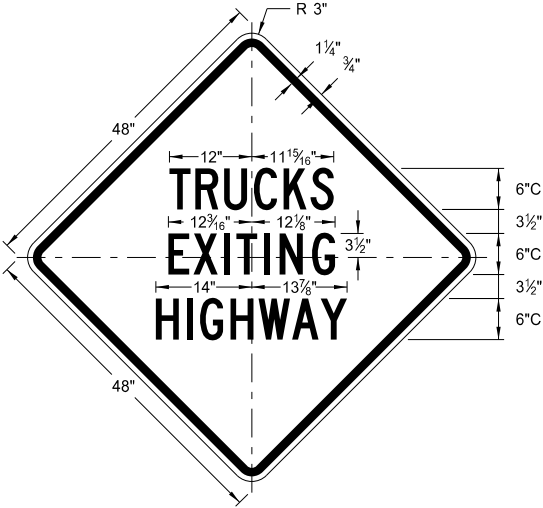
W22-8-48  
Legend: black (non-refl)  
Background: orange



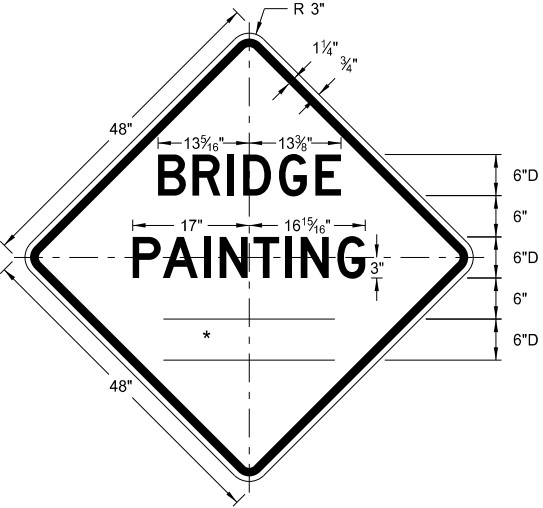
ARROW DETAILS



W8-53-48  
Legend: black (non-refl)  
Background: orange



W8-56-48  
Legend: black (non-refl)  
Background: orange



W21-50-48  
Legend: black (non-refl)  
Background: orange

|  |        |
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# CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background  
Interstate Business Loop - white legend on green background  
US and State - black legend on white background  
County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

## MINIMUM BALLAST (For each side of sign support base)

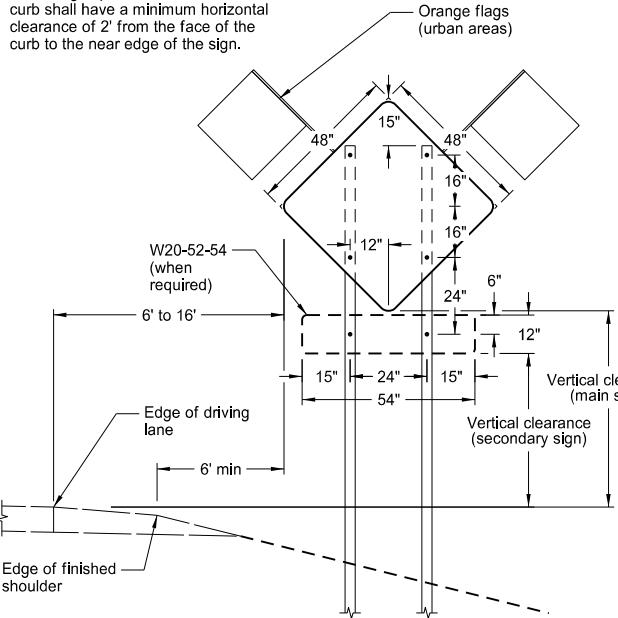
| Sign Panel Mounting Height (ft) | Number of 25 lb sandbags for 4' x 4' sign panel |
|---------------------------------|---|
| 1'                              | 6   |
| 5'                              | 8   |
| 7'                              | 10  |

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

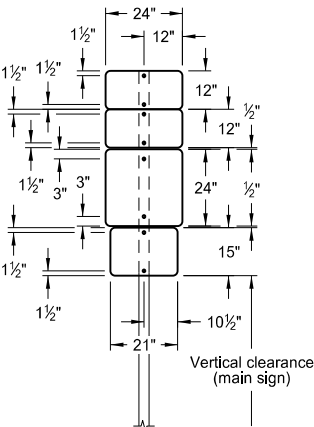
|  |                 |
|--|-----------------|
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| 11-14-13                                     | Revised Note 6. |

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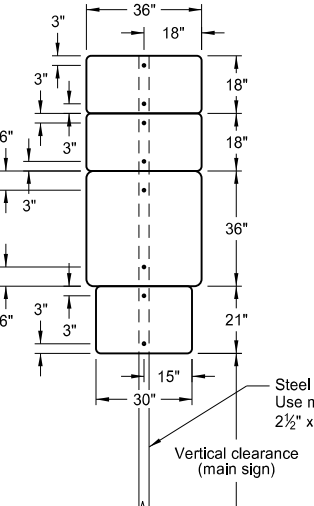
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



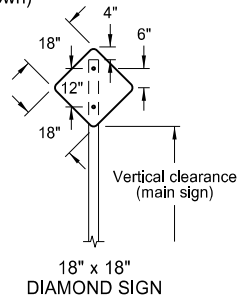
TYPICAL SECTION  
(48" x 48" diamond warning sign shown)



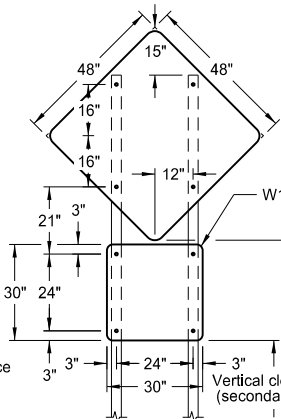
24" x 24" ROUTE MARKER ASSEMBLY



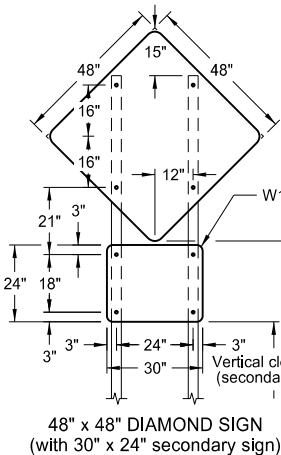
36" x 36" ROUTE MARKER ASSEMBLY



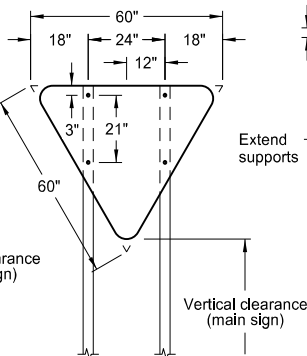
18" x 18" DIAMOND SIGN



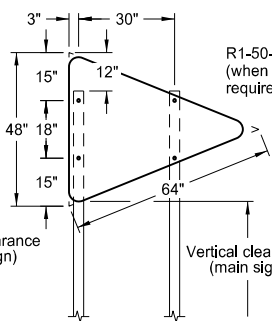
48" x 48" DIAMOND SIGN  
(with 30" x 30" secondary sign)



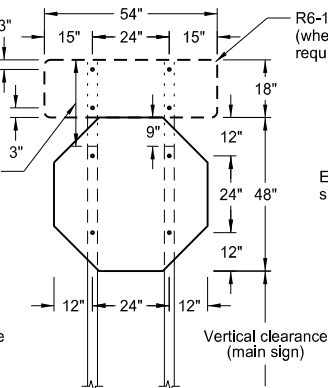
48" x 48" DIAMOND SIGN  
(with 30" x 24" secondary sign)



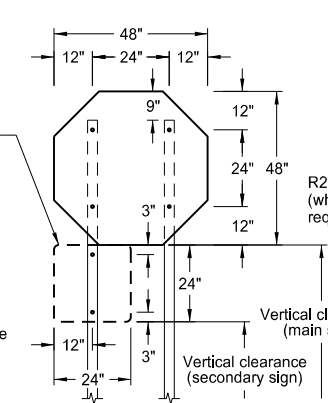
R1-2-60 - YIELD SIGN



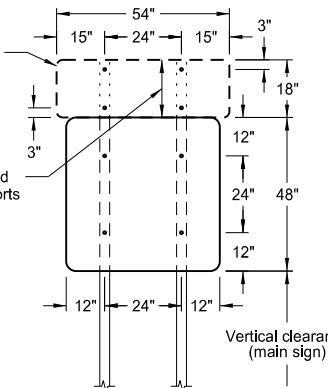
W14-3-64 - PENNANT SIGN



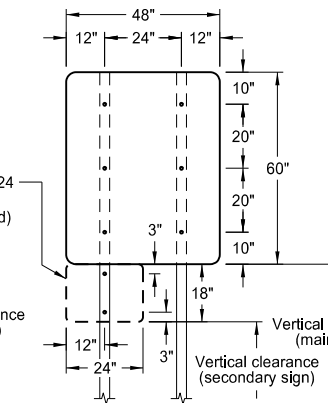
R1-1-48 - STOP SIGN  
(with R6-1-54 sign as required)



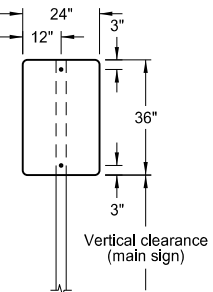
R1-1-48 - STOP SIGN  
(with R1-50-24 sign as required)



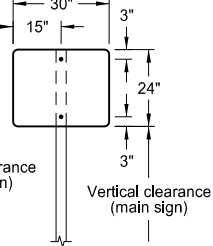
48" x 48" SIGN  
(with R6-1-54 sign as required)



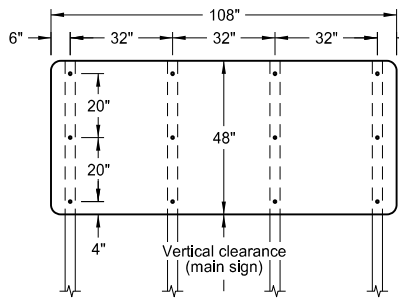
48" x 48" SIGN  
(with R2-1a-24 sign as required)



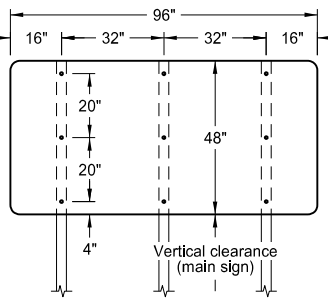
24" x 36" SIGN



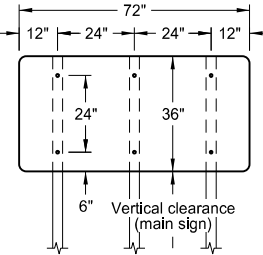
30" x 24" SIGN



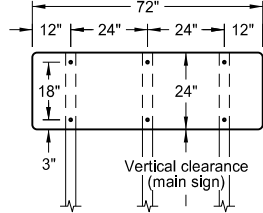
108" x 48" SIGN



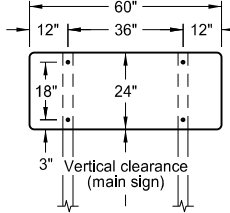
96" x 48" SIGN



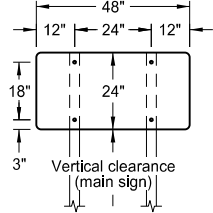
72" x 36" SIGN



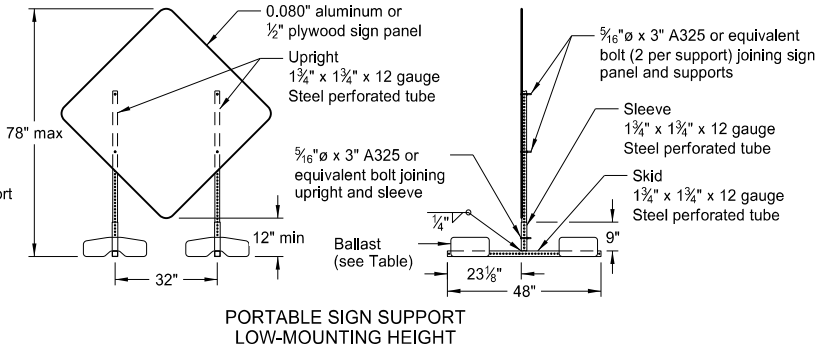
72" x 24" SIGN



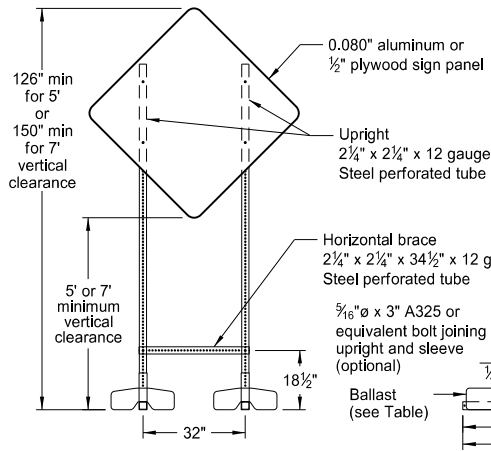
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT  
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT  
HIGH-MOUNTING HEIGHT

# ROAD CLOSURE LAYOUTS

## Notes

- Variables  
S = Numerical value of speed limit or 85th percentile.  
W = The width of taper.  
L = Minimum length of taper, or  $S \times W$  for freeways, expressways, and all other roads with speeds of 45 mph or greater, or  $W \times S^2/60$  for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
- Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
- Sequencing Arrow Panels  
Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.  
Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).  
Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).  
Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at  $\frac{1}{2}$  B.
- Use when work area is 1 mile or longer.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

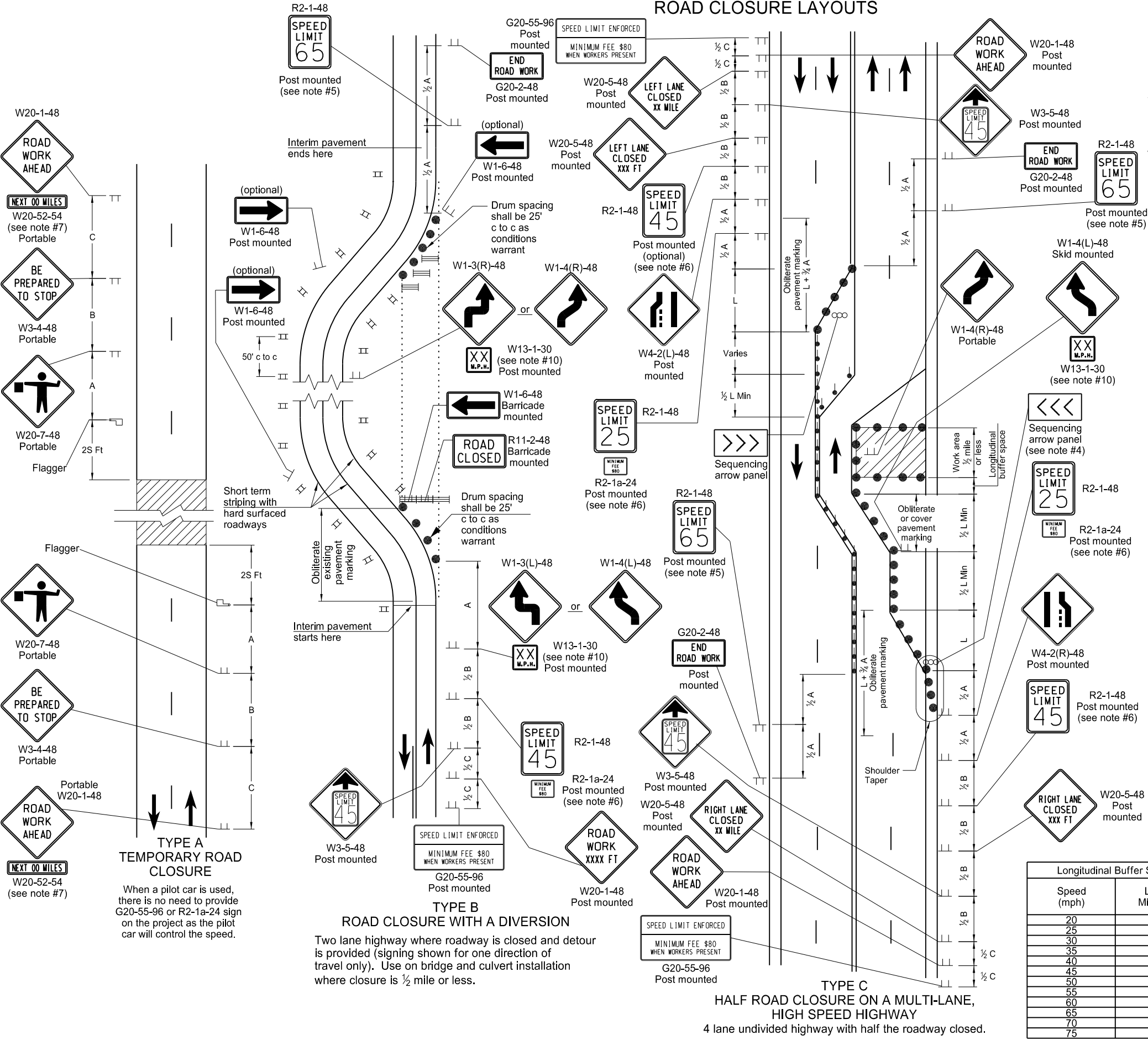
| ADVANCE WARNING SIGN SPACING                          |                                  |      |      |
|---|----------------------------------|------|------|
| Road Type   | Distance Between Signs Min. (ft) |      |      |
|   | A                                | B    | C    |
| Urban - Low Speed (30 mph or less)                    | 150                              | 150  | 150  |
| Urban - Low Speed (over 30 to 40 mph)                 | 280                              | 280  | 280  |
| Urban - High Speed (over 40 mph to 50 mph)            | 360                              | 360  | 360  |
| Rural - High Speed (over 50 mph to 65 mph)            | 720                              | 720  | 720  |
| Urban Expressway and Freeway (55 mph to 60 mph)       | 850                              | 1350 | 2200 |
| Rural Expressway and Freeway (70 mph to 75 mph)       | 1000                             | 1500 | 2640 |
| Interstate/4-Lane Divided (Maintenance and Surveying) | 750                              | 1000 | 1500 |

| KEY |                              |
|-----|------------------------------|
|     | Type III barricade           |
|     | Sign                         |
|     | Delineator drum              |
|     | Tubular markers              |
|     | Work area                    |
|     | Flagger                      |
|     | Sequencing arrow panel       |
|     | Vertical panels back to back |

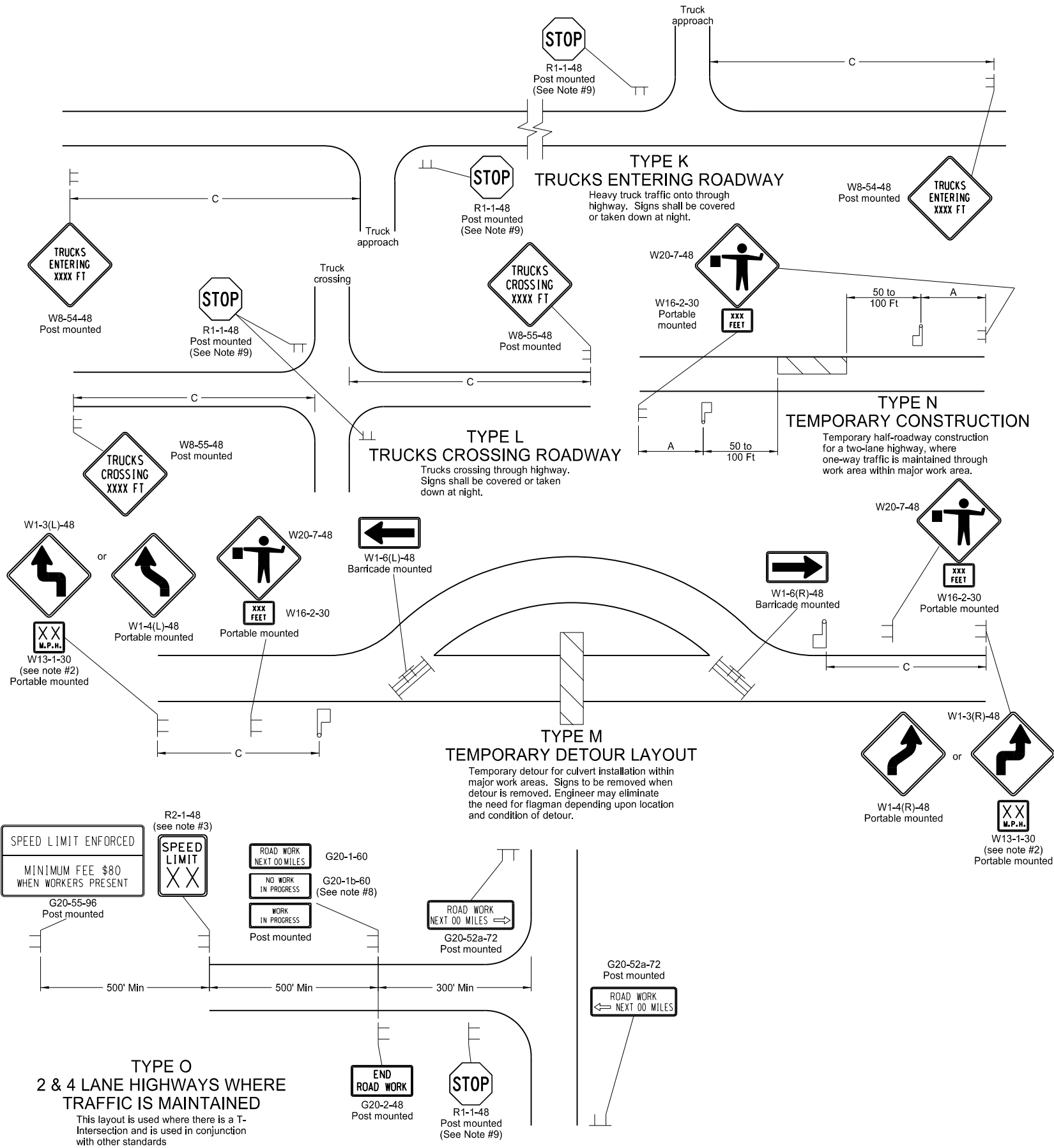
| Longitudinal Buffer Space |                   |
|---------------------------|-------------------|
| Speed (mph)               | Length Min (feet) |
| 20                        | 115               |
| 25                        | 155               |
| 30                        | 200               |
| 35                        | 250               |
| 40                        | 305               |
| 45                        | 360               |
| 50                        | 425               |
| 55                        | 495               |
| 60                        | 570               |
| 65                        | 645               |
| 70                        | 730               |
| 75                        | 820               |

|  |        |
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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS



- Notes
1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies. Where necessary, safe speed to be determined by the Engineer.
  2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
  3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
  4. Existing speed limit signs within a reduced speed zone shall be covered. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
  5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
  6. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
  7. If existing stop sign is in place, a 48" stop sign is not required.
  8. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

| KEY |                    |  |           |
|-----|--------------------|--|-----------|
|     | Type III barricade |  | Work area |
|     | Sign               |  | Flagger   |

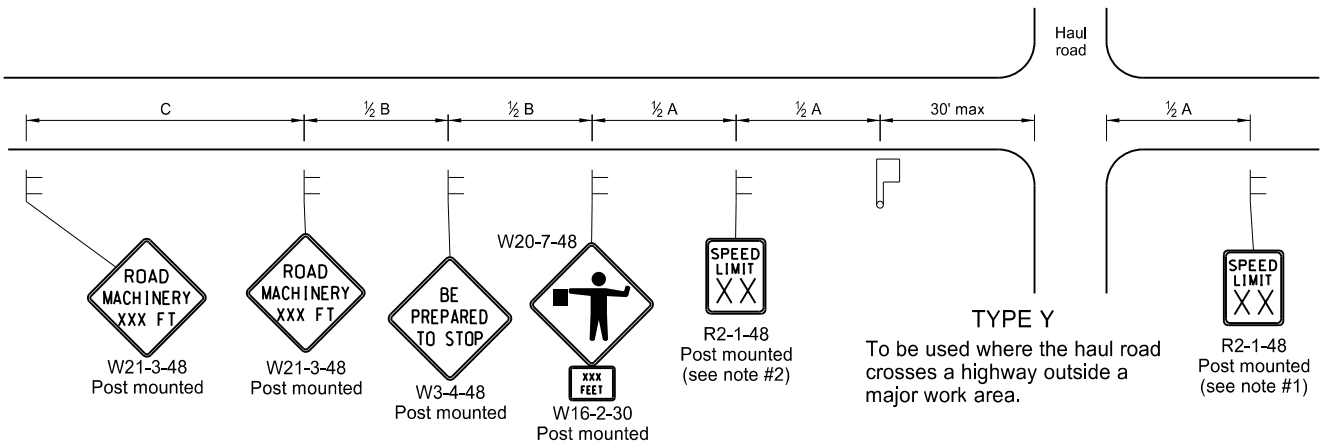
| ADVANCE WARNING SIGN SPACING                          |                                  |      |      |
|---|----------------------------------|------|------|
| Road Type   | Distance Between Signs Min. (ft) |      |      |
|   | A                                | B    | C    |
| Urban - Low Speed (30 mph or less)                    | 150                              | 150  | 150  |
| Urban - Low Speed (over 30 to 40mph)                  | 280                              | 280  | 280  |
| Urban - High Speed (over 40 mph to 50 mph)            | 360                              | 360  | 360  |
| Rural - High Speed (over 50 mph to 65 mph)            | 720                              | 720  | 720  |
| Urban Expressway and Freeway (55 mph to 60 mph)       | 850                              | 1350 | 2200 |
| Rural Expressway and Freeway (70 mph to 75 mph)       | 1000                             | 1500 | 2640 |
| Interstate/4-Lane Divided (Maintenance and Surveying) | 750                              | 1000 | 1500 |

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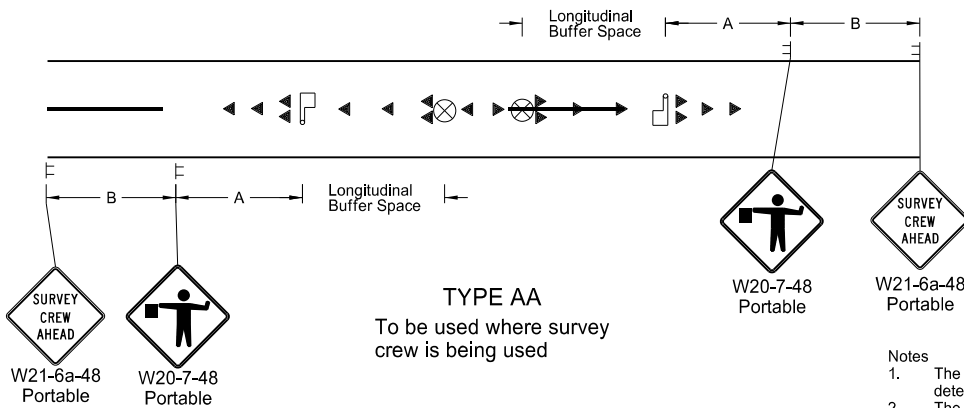
MISCELLANEOUS SIGN LAYOUTS

D-704-26



**TYPE Y**  
To be used where the haul road crosses a highway outside a major work area.

R2-1-48  
Post mounted  
(see note #1)



**TYPE AA**  
To be used where survey crew is being used

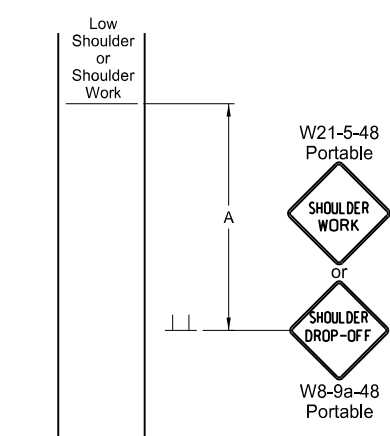
W21-6a-48  
Portable

W20-7-48  
Portable

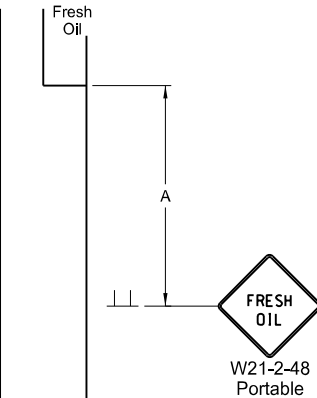
**TYPE KK**  
To be used at major intersections within pilot car control area

Stop Sign  
WAIT FOR PILOT CAR  
G20-4b-36  
Portable

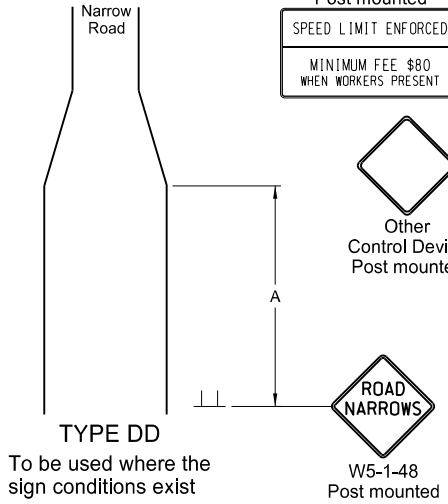
- Notes
1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
  2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
  3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
  4. Existing speed limit signs within a reduced speed zone shall be covered.
  5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
  6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
  7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



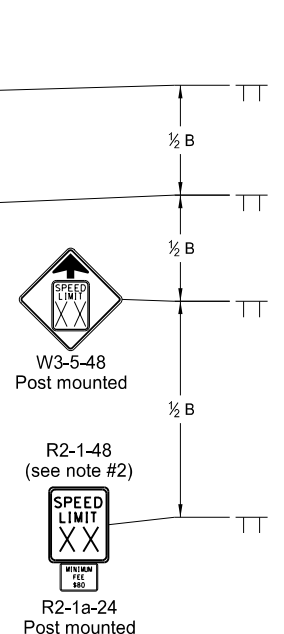
**TYPE BB**  
To be used within a major work area where the sign conditions exist



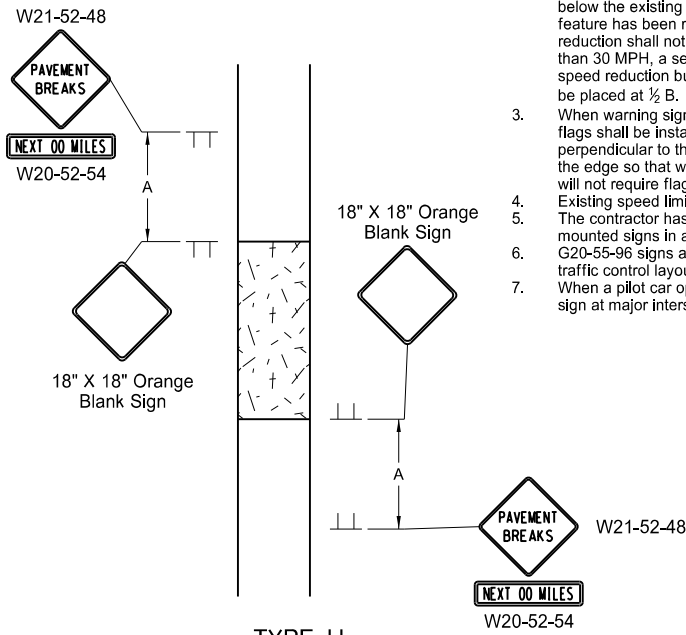
**TYPE CC**  
To be used where the sign conditions exist



**TYPE DD**  
To be used where the sign conditions exist



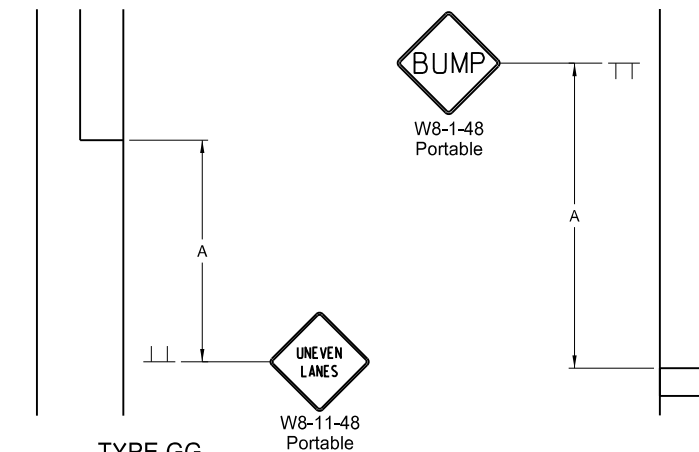
**TYPE Z**  
To be used where speed zone is needed



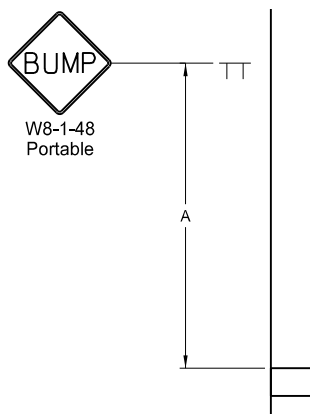
**TYPE JJ**  
To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

| Longitudinal Buffer Space |                   |
|---------------------------|-------------------|
| *Speed (mph)              | Length Min (feet) |
| 20                        | 115               |
| 25                        | 155               |
| 30                        | 200               |
| 35                        | 250               |
| 40                        | 305               |
| 45                        | 360               |
| 50                        | 425               |
| 55                        | 495               |
| 60                        | 570               |
| 65                        | 645               |
| 70                        | 730               |
| 75                        | 820               |

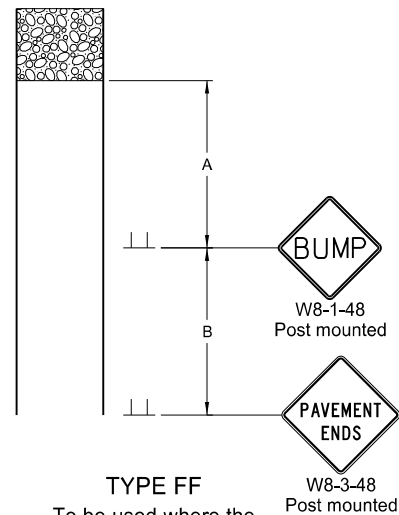
\* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.



**TYPE GG**  
To be used where a difference of elevation between lanes exist



**TYPE EE**  
To be used where the sign conditions exist



**TYPE FF**  
To be used where the sign conditions exist

- KEY
- Sign
  - Cones
  - Flagger

| ADVANCE WARNING SIGN SPACING                          |                                  |      |      |
|---|----------------------------------|------|------|
| Road Type   | Distance Between Signs Min. (ft) |      |      |
|   | A                                | B    | C    |
| Urban - Low Speed (30 mph or less)                    | 150                              | 150  | 150  |
| Urban - Low Speed (over 30 to 40 mph)                 | 280                              | 280  | 280  |
| Urban - High Speed (over 40 mph to 50 mph)            | 360                              | 360  | 360  |
| Rural - High Speed (over 50 mph to 65 mph)            | 720                              | 720  | 720  |
| Urban Expressway and Freeway (55 mph to 60 mph)       | 850                              | 1350 | 2200 |
| Rural Expressway and Freeway (70 mph to 75 mph)       | 1000                             | 1500 | 2640 |
| Interstate/4-Lane Divided (Maintenance and Surveying) | 750                              | 1000 | 1500 |

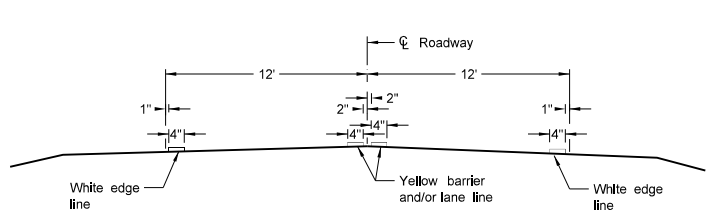
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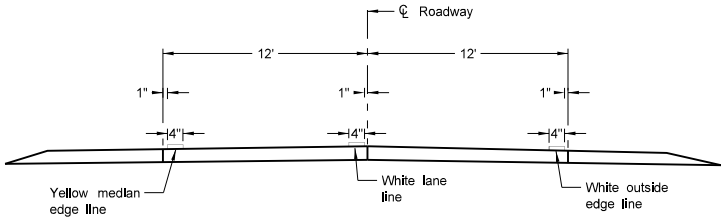
PAVEMENT MARKING

D-762-4

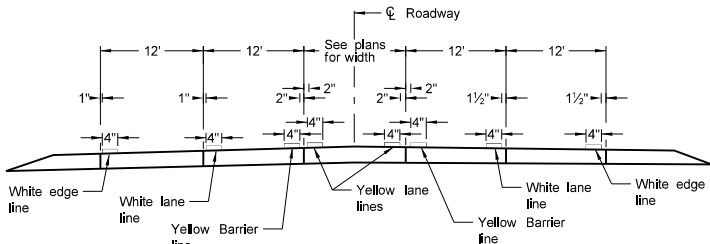
NOTES:  
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



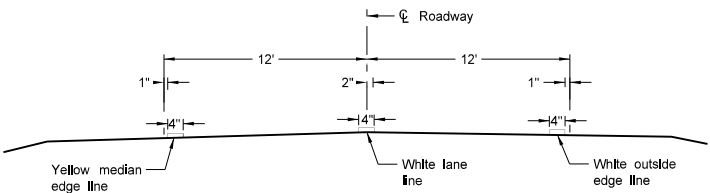
Two Lane Two Way  
RURAL ROADWAY



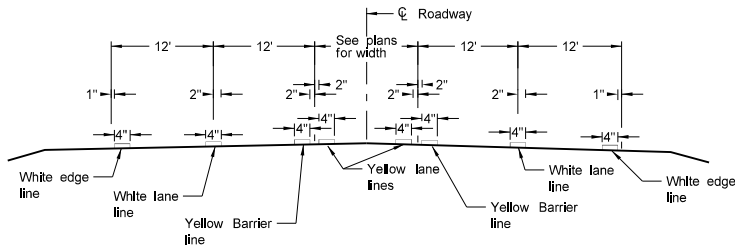
Two Lane Roadway  
INTERSTATE HIGHWAY  
Concrete Section



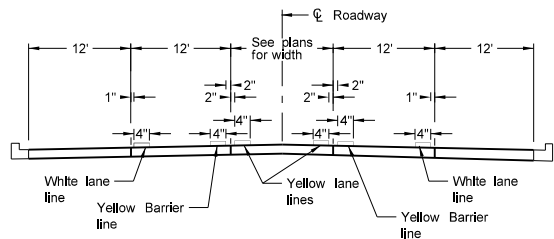
RURAL FIVE LANE ROADWAY  
Concrete Section



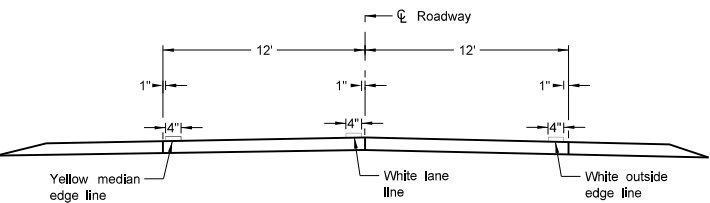
Two Lane Divided  
Rural Roadway  
PRIMARY HIGHWAY  
Asphalt Section



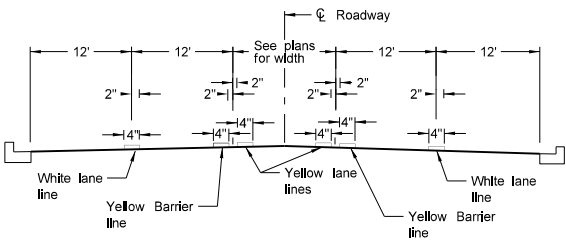
RURAL FIVE LANE ROADWAY  
Asphalt Section



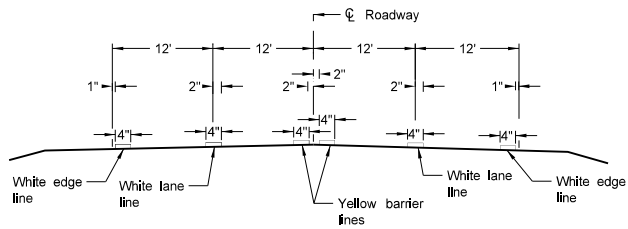
URBAN FIVE LANE SECTION  
Concrete Section



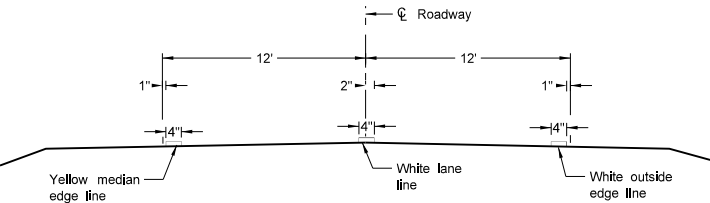
Two Lane Roadway  
PRIMARY HIGHWAY  
Concrete Section



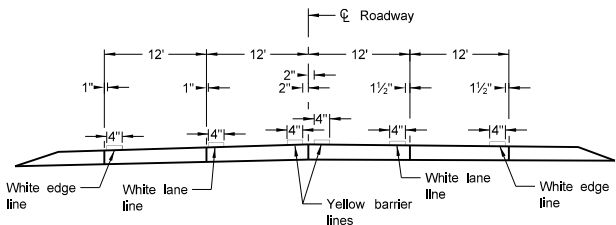
URBAN FIVE LANE SECTION  
Asphalt Section



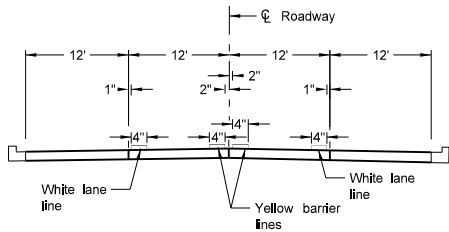
RURAL FOUR LANE ROADWAY  
Asphalt Section



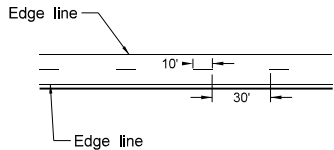
Two Lane Roadway  
INTERSTATE HIGHWAY  
Asphalt Section



RURAL FOUR LANE ROADWAY  
Concrete Section



URBAN FOUR LANE SECTION  
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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